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STOPPING WATER POLLUTION AT ITS SOURCE

MISA
Municipal/Industrial Strategy for Abatement

THE DEVELOPMENT DOCUMENT FOR THE DRAFT EFFLUENT MONITORING REGULATION FOR THE ONTARIO MINERAL INDUSTRY: GROUP B

INDUSTRIAL MINERALS SECTOR

Environment
Ontario

Jim Bradley
Minister

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The development document for
the draft effluent monitoring
regulation for the Ontario
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INDUSTRIAL MINERALS SECTOR

OCTOBER 1989

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FOREWORD

The Municipal/Industrial Strategy for Abatement (MISA) program is aimed at reducing discharges of toxic contaminants to Ontario's waterways. The ultimate goal of the MISA program is the virtual elimination of persistent toxic contaminants from all discharges to Ontario's receiving waters.

Under the MISA program, the monitoring requirements for each sector are specified in two regulations - The General Effluent Monitoring Regulation (Ontario Regulation 695/88), and the relevant specific Sector Regulation.

The General Effluent Monitoring Regulation provides the technical principles which are common to all sectors. It covers the "how to" items such as sampling, chemical analysis, toxicity testing, flow measurement, and reporting.

The specific Sector Regulation specifies the monitoring requirements of each direct discharger, such as: the actual parameters to be monitored, the frequency of monitoring, and the Regulation in-force dates.

This document contains:

1. An overview of the Industrial Minerals Sector, which includes descriptions of the category classifications within this sector, as they apply to the Ontario Industrial Minerals Industry.
2. The Technical Rationale document for the Industrial Minerals Sector in Ontario which describes the derivation of the monitoring parameters and the monitoring frequencies that are used in the Effluent Monitoring Regulation.
3. The Draft Effluent Monitoring Regulation for the Industrial Minerals Sector in Ontario.
4. Explanatory Notes which describe the legal requirements stated in the Regulation.
5. The MISA Advisory Committee's (MAC) report to the Minister of the Environment on the Draft Effluent Monitoring Regulation for the Industrial Minerals Sector.
6. The Ministry of the Environment's response to the MISA Advisory Committee report.

The General Effluent Monitoring Regulation, which must be used in conjunction with the sector specific regulation, is published under a separate cover. The same document also includes a discussion of the MISA approach to effluent monitoring.

PART A

OVERVIEW OF THE ONTARIO MINERAL INDUSTRY:
GROUP B,
INDUSTRIAL MINERALS SECTOR

PART A - OVERVIEW OF THE INDUSTRIAL MINERALS SECTOR

I INTRODUCTION

The first part of this section serves as an introduction to the Industrial Minerals Sector. It defines the sector and describes the applicable mining and manufacturing processes, the general process chemistry, in addition to wastewater generation and treatment.

The section concludes with a specific outline of each of the nine categories. Emphasis is placed on the unique features of each category and the potential impact of operations on the environment.

II DEFINITION OF THE INDUSTRIAL MINERALS SECTOR

Industrial minerals are those non-fuel minerals and rocks that are mined, processed and utilized for purposes other than for their metal content (with the exception of magnesium).

Two classes of industrial minerals are recognized in Ontario; non-metallic minerals, and structural materials.

Non-metallic minerals and rocks mined in Ontario include; barite, gemstones, graphite, gypsum, nepheline syenite, quartz (silica), salt, and talc.

Structural materials consist of naturally occurring sand and gravel, and crushed stone (limestone). Also included are materials that are manufactured from rocks (e.g. lime, cement), or from sediment (e.g. clay brick).

In addition to the non-metallic minerals and structural materials, the production of magnesium from dolomite is also included.

The Mineral Industries under consideration include only those operations which discharge wastewater to a surface watercourse. Subsequently, the mining of barite, gemstones and quartz have been excluded from further discussion since their operation is essentially dry. Salt mining has also been omitted since it is included within the Ontario Mineral Industry Sector: Group A.

Industrial mineral operations , that involve the production and direct discharge of wastewater to Ontario's surface waters, are divided into nine categories. The unique nature of each category is derived from a combination of factors pertaining to mining methods, processing and wastewater quality. The categories are as follows;

1) Cement,
2) Chemical Lime,
3) Clay and Shale, (clay brick)
4) Graphite,
5) Gypsum, (plaster of paris, wall board)
6) Magnesium,
7) Quarries, (nepheline syenite, crushed limestone, traprock)
8) Sand and Gravel,
9) Talc, (talcum powder)

III MINING PROCESSES

i. SURFACE MINING

Surface (open pit) mining is used extensively to recover minerals that occur in massive deposits usually found near the earth's surface, such as limestone, dolomite, sand, gravel and clay. Generally, sites that employ open pit mining are referred to as quarries or pits.

The categories active in this type of mining include Chemical Lime, Clay & Shale, Graphite, Quarries and Sand & Gravel, as well as one of the plants within the Talc category. Due to the relatively low value of industrial minerals on a unit weight basis, open pit mining is the preferred method of product recovery.

The open pit method offers a number of advantages. It is quite flexible in that it allows for large increases or decreases in production capacities on short notice. The method is inherently safe since crews can be readily observed by supervisors and loose material can be seen and removed or avoided. The relatively small number of men employed contributes to safety and cost effectiveness. Selective mining is possible without difficulty. Grade control can be easily accomplished by leaving lean sections temporarily unmined. The total cost of open pit mining, per tonne recovered, is usually only a fraction of the cost of underground mining. Further, the cost spread between the two methods is growing wider as larger-scale methods are applied to open pits.

The various steps normally used in open pit mining include stripping, breaking (blasting), loading and hauling of material, classification, crushing, secondary classification and delivery or stockpiling of processed materials.

Stripping

Material overlying an orebody may consist of earth, sand, gravel, silt, rock or even water. Removal of this material generally falls under the heading of stripping. Stripping is generally accomplished with heavy earth-moving equipment. Suction and cutter dredges are sometimes used (e.g. where removal takes place below the water table). Removal of overburden usually takes place concurrently with construction of the surface plant.

Breaking

Drilling is the basic part of the breaking operation in open pit mining. There are several types of drills which can be used. These include churn drills, percussion drills, rotary drills and jet-piercing drills. All are designed to produce a hole of required diameter, depth and direction in rock for later insertion of explosives.

Basically, explosives are composed of chemicals which, when combined, contain all the requirements for complete combustion without an external oxygen supply. Early explosives such as dynamite consisted chiefly of nitroglycerine, carbonaceous material and an oxidizing agent. These mixtures were packaged into cartridges for convenience in handling and loading into holes. Many explosives are still manufactured and packaged according to the basic formulas.

In recent years it has been discovered that fertilizer-grade ammonium nitrate mixed with about 6% fuel oil (the mixture is called ANFO) could be detonated with a high-explosive primer. Virtually all open pit mining operations currently use this mixture for some or all of the blasting. Water Gels and Slurries which are mixtures of an oxidizer, a fuel and a sensitizer in an aqueous medium are also used. The gels are injected on-site. Typical ingredients of gel and slurry explosives include ammonium and sodium nitrate, gelling agents, fumaric acid, ethylene glycol and ammonium sulfamate.

Loading / Haulage

After the ore has been broken, it is transferred to the processing plant for treatment. Although a variety of loading equipment is used in open pit mines depending on the scale of operations, the power shovel seems to be preferred. On-site haulage is performed using trucks or conveyors for movement of materials to the processing plant.

ii. UNDERGROUND MINING (TALC AND GYPSUM)

The only industrial minerals currently mined in Ontario using underground mining are Talc and Gypsum. Across North America, slightly more than 50 percent of the talc is mined underground with the remaining operations employing surface methods. With respect to Gypsum mines, both surface mining and underground mining are practised; however, in Ontario underground mining is the predominant method.

The underground mining methods employed by the Talc mining industries may range from conventional mining using shrinkage stoping to the room-and-pillar method of mining. These mining methods are discussed later in the section. Because of the slippery nature of the ore, the orebody sometimes requires specially placed timber supports.

Gypsum is extracted in Ontario by underground mining at Caledonia, Hagersville, and Drumbo using the room-and-pillar method.

The Mine Shaft

When a mine is put into operation, a shaft is sunk near the orebody. Horizontal passages are cut from the shaft at various depths to reach the ore. The ore is then removed, hoisted to the surface and often processed on-site .

The shaft provides a means of entry or exit for people, materials, and for the removal of ore or waste from underground to surface. It may be vertical or inclined. Shaft conveyances include buckets, skips, cages or skip-cage combinations.

In Ontario, mines have ranged to a depth of more than 2500 metres, however the depth of the underground mine workings in the Talc category is only about 180 metres.

Levels

Levels are horizontal passages in a mine, which are generally driven from the shaft at intervals of 30 to 60 metres. That part of the level driven from the shaft to the orebody is known as the crosscut, and that part which continues along the orebody is known as a drift. Crosscuts and drifts vary in size depending on the size of the haulage equipment in use. A raise is an opening made in the back (roof) of a level to reach the level above.

Stoping

A stope is an excavation where ore is drilled, blasted and removed by gravity through chutes to ore cars on the haulage level below.

Stopes require openings (manways) to provide access for people and materials. Normally, raises connect a stope to the level above and are used for ventilation, for convenience in getting people and materials into the stope, and for admitting backfill.

Shrinkage stoping is used chiefly in narrow regular orebodies where the walls and ore require little support. After each blast, sufficient ore is pulled from the chutes to make room for the miners to drill and blast the next section. As the stope progress upwards, the manways are raised slightly above the level of the broken ore. On removal of the ore, the stope may be filled with waste material.

Gypsum is generally found associated with limestone, dolomite, shale and clay in strata or seams. The width of the seams in Ontario gypsum mines varies from 3 to 9 feet. In room-and-pillar mining, about 20% of the seam is left undisturbed in the form of pillars to support the mine. Rooms vary from 20 to 24 feet in width and cross-cuts are arranged to leave pillars 12 by 18 feet. The mine roof is thus, self-supporting and timbering is used only in wider areas of the main hallways or where the thickness of the solid rock above the roof is insufficient.

iii. CRUSHING

The coarse ore is crushed using a primary crusher. This is usually a jaw crusher, which consists essentially of a fixed vertical jaw or plate, and a movable jaw which is set at a slight vertical angle and is pushed backwards and forwards by a system of toggles. The rock falls into the opening between the jaws at the top of the crusher and is crushed by the rapid, but short, forward motion of the movable jaw. The plates converge towards the bottom and thus the rock may be pinched and shattered several times before it falls free of the bottom opening.

Some large tonnage plants use a gyratory crusher for the primary breaker. It consists of a heavy gyratory crushing head mounted on a vertical shaft which works in a crushing bowl that is fixed to the main frame. Rock introduced into the bowl is caught and nipped by the gyrating head, then falls through an opening of predetermined size. Gyratory crushers, usually installed on the surface at large mining properties, can handle three to four hundred tonnes per hour.

The need for a secondary crusher frequently arises when the product from the primary crusher is too large for efficient grinding.

Crushing is performed dry. Capacity is usually such that the entire daily tonnage requirement is crushed in one or two shifts. This permits balancing of power loads and labour requirements, and provides an opportunity for repairs.

Size control of the crusher house product is generally achieved with the use of a vibrating screen. The oversize material from the screen is returned for further crushing. The remainder of the material is the finished product, unless washing of the product is required.

Crusher houses are generally equipped with dust control and ventilation systems which are designed to eliminate any accumulation of dust particles in the air.

Other crushing equipment can include: roller, cone, or impact crushers.

iv. CLASSIFICATION

This is the physical separation of materials into various size fractions. The oversize material is further processed by crushing or grinding (fine aggregates only) until the desired product size is obtained.

The most common type of classification in this sector is screening. Portable, semi-portable, or permanent type equipment with single, double, or triple deck type screens, are generally used. The equipment types include;

- inclined screens,
- horizontal screens,
- inclined vibrating screens,
- horizontal vibrating screens, and
- cylindrical rotating screens.

In the case of fine aggregates, further classification (secondary classification) is obtained by the following;

- hydrocyclones,
- hydraulic classifiers,
- settling tanks, and
- screw / rake classifiers.

IV PRODUCTION OPERATIONS

i. PORTLAND CEMENT PRODUCTION

Lime which is the principal raw material is commonly obtained from limestone, cement rock, chalk or marble, all of which are primarily calcium carbonate. Cement plants in Ontario are generally situated in areas which contain limestone deposits for easy access to raw materials.

The raw materials used for the production of cement are combined in order to achieve the desired proportions of lime, iron, silica, and alumina components. The remaining ingredients, other than lime, may be obtained from a variety of industrial by-products such as sand, clay, shale, iron ore and blast furnace slag.

The major steps involved in cement production are;

- comminution and blending of raw materials,
- production of clinker, and
- grinding of clinker.

The raw materials are blended and sometimes ground before use. Both wet and dry grinding of materials are utilized, thus leading to the two basic processes for cement manufacturing; "wet" and "dry". Processing operations using the "dry process" involve grinding, blending and kiln feeding in the dry state. In the "wet process", grinding and blending is achieved in slurry form. At "wet" plants, the finely ground raw materials are stored in slurry tanks. The finely ground dry materials at "dry" plants are stored in silos.

The blended materials are fed into the upper end of a rotary kiln. At temperatures between 400 C and 800 C calcination occurs, converting limestone $CaCO_3$, to lime, CaO. Calcium oxide combines with the acidic components of the raw mix at about 1400 C and 1650 C to form calcium silicates, calcium aluminate and calcium aluminoferrite. At 1600 C , the raw materials fuse together to produce hard, marble-sized balls termed clinker. At the discharge end of the kiln, the clinker is rapidly cooled with air.

The water associated with the "wet" processing methods is lost as vapour to the atmosphere during the calcination process in the kilns.

The final cement product is manufactured by pulverizing the clinker. A small amount of gypsum is added during the comminution process. The gypsum is used to control the setting rate of the cement.

The energy produced during grinding is transferred to the cement as heat. The excess heat from the cement is removed by passing the cement through a cooling jacket. Water is used as the indirect cooling medium which is circulated through the jacket or across the heat exchange surface.

Pneumatic pumps are used to transport the finely ground cement within the plant. The air supply for pneumatic operation is provided by water cooled compressors. Dry grinding and pneumatic pumping are major sources of dust problems at cement plants.

ii. CHEMICAL LIME PRODUCTION

Quarried limestone is the raw material for the production of chemical lime.

Chemical lime production involves the following operations;

- primary crushing,
- conveying,
- classification, and
- calcination.

Primary crushing of limestone is carried out using jaw or gyratory crushers. Grizzlies (screens) are also optionally employed to remove undersized stone. Some plants utilize secondary crushing to make by-product stone saleable.

Rubber belt conveyors are generally used to convey crushed stone to the processing plant. Screens are used to obtain various size fractions of material for further processing or as final product for sale.

In order to achieve calcination, the raw material is fed into the upper end of a kiln, and then passes through the kiln at a rate controlled by the slope and the rotational speed. Burned fuel (powdered coal, fuel oil, or gas) is forced into the lower end of the kiln where it produces temperatures of 400 C to 800 C for calcination. The carbon dioxide gas that is evolved is removed and cleaned using electrostatic precipitators or wet scrubbers.

The resulting product is cooled, and it may then be classified, hydrated, transferred to storage or packaging facilities, or it may be loaded onto bulk carriers for shipment.

iii. CLAY AND SHALE PRODUCTION

Two types of shales are obtained in Ontario; the red Queenston shales and the Georgian Bay grey shales.

The Clay & Shale category includes brick manufacturing plants in the province. Brick technology is divided into four main process stages which cover;

- mining and processing of raw materials,
- shaping and forming,

- drying and firing, and
- inspection and packaging.

Shale and Clay are mined in open pits using rippers, scrapers, bulldozers and front-end loaders. Blasting and drilling are rarely used. The ore is then loaded on trucks and sent to the processing plant.

Comminution is achieved through the use of a primary crusher and pan mill grinder. This is followed by classification of the ground product using a series of screen decks. The oversize material is returned to the pan mill and the finished products are delivered to extrusion machines where bricks are formed. The bricks are dried, fired, inspected and shipped to customers.

Since excess water is collected only during the mining and processing stage, other aspects of brick manufacturing technology will not be reviewed. Even in the mining of shale and clay, there is no direct use of water for industrial operations. Only rainfall and groundwater seepage into pits result in the need for pit dewatering. Water collects within the pits due to the impermeability of the clay surface.

iv. GRAPHITE PRODUCTION

Graphite is a naturally occurring mineral form of elemental carbon. It is typically found in veins, isolated pockets or as flakes within the host rock. Minerals associated with the occurrence of graphite include feldspar, quartz, mica, pyroxene, zircon, and iron sulfides.

In Ontario, the ore is mined using open pit methods. Following the excavation stage which includes drilling and blasting, the broken ore is transported by truck to the plant where it undergoes crushing and grinding.

Milling is used to release the graphite flakes from the waste rock. Since graphite floats, flotation is used as the separation process for producing a graphite concentrate. PH adjustment or the addition of various reagents (e.g. kerosene) may be used to enhance flotation. The graphite concentrate is floated, thickened, filtered and dried. The slurried waste rock is discharged to a tailings pond.

Some of the water from the tailings pond may be recycled back to the plant following treatment by sedimentation.

v. GYPSUM PRODUCTION

Gypsum (hydrated calcium sulfate), is extracted from sedimentary deposits in Ontario using the room-and-pillar method. The ore is then calcined for the production of gypsum products.

The processing steps associated with gypsum production include;

- primary crushing,
- conveying,
- secondary crushing,
- classification,
- calcination, and
- grinding.

Primary and secondary crushing is achieved at most mines using gyratory and jaw crushers, or impact mills. The ore is transported from the underground mine to a surface milling plant using skips or belt conveyors, where in may undergo secondary crushing. At one of the Ontario plants, heavy media separation, using ferro-silicon as the medium, is employed for the removal of impurities from the ore. During the calcination process which takes place in rotary kilns or kettles, approximately 75% of the water of hydration is driven off. The process usually takes approximately 2-3 hrs during constant agitation at a temperature between 121 and 150 C. The final product is in a hemi-hydrated form and is commonly known as plaster of paris.

The calcined gypsum undergoes final grinding normally by either hammermills or roller mills. Screens and cyclone-type particle collectors are arranged in a closed-circuit configuration for recycle of the dust. Crushing areas are generally equipped with dust control and ventilation systems to eliminate dust problems. The final product is used in the manufacture of gypsum plasters and wallboards.

vi. MAGNESIUM PRODUCTION

Dolomite is currently the only domestic ore used as the principal raw material for the production of magnesium metal. The production steps may be summarized as follows;

- surface mining of dolomite,
- primary and secondary crushing (gyratory or jaw crushers),

- calcination,
- grinding (roller mill),
- mixing,
- briquetting, and
- thermal reduction.

The dolomite is quarried using conventional open pit mining techniques. This is followed by primary and secondary crushing. Calcination takes place in rotary kilns. Here, the dolomite is converted to MgO.CaO. Finely ground ferrosilicon is mixed with the calcined dolomite. Hard dense briquettes are produced with a briquetting machine.

Thermal reduction is completed under vacuum and high temperature conditions to produce magnesium metal.

vii. CRUSHED STONE PRODUCTION (QUARRIES)

Types of equipment similar to those for sand and gravel production are used for limestone operations. Also included are the additional steps of blasting and heavy crushing.

Production of crushed stone obtained by quarrying involves the following steps;

- removal of overburden,
- drilling,
- blasting,
- loading and hauling of loosened material,
- crushing
- screening (classification)
- washing (in some cases), and
- stockpiling and delivery.

viii. SAND AND GRAVEL PRODUCTION

Two types of product are available on the market - processed or unprocessed sand and gravel.

Many producers of sand and gravel do not process the raw materials. After the removal of overburden, material is excavated, loaded, and is then delivered to the customer.

The production of processed sand and gravel involves the following operations, or combinations thereof;

- removal of overburden,
- excavation of material,
- haulage,
- primary classification,
- primary and secondary crushing, and
- secondary classification.

The material is excavated using front-end loaders, power shovels,dragline, bulldozer, or any other earth-moving equipment. It is hauled on-site by truck or conveyor to the processing plant where it is subjected to primary classification using inclined vibrating or rotating screens. The larger aggregates may be subjected to further crushing with jaw, gyrating, roller, cone, or impact crushers.

Secondary classification of the final sized products is obtained through screening and dewatering.

The processed material is delivered or stockpiled. Stockpiling is implemented to overcome variations in process operations (e.g. seasonal processes or operations such as washing) and fluctuations in product demand.

ix. TALC PRODUCTION

Talc is a soft, hydrous magnesium silicate mineral. In Ontario, it is obtained by either underground or surface mining. Talc processing may vary from simple dry grinding to more complex techniques such as flotation.

Processing steps at Ontario talc mines producing high purity talc include;

- primary crushing (jaw or impact crushers),
- screening,
- secondary crushing (impact or cone crusher),
- drying, and
- fine grinding (roller mills and high speed hammer mills).

As a result of the dry grinding process, dust is generated; thus developing a need for dust control equipment.

Talc deposits which are impure, such as talc magnesite or talc-dolomite, require different processing methods because of the need for raw material purification. After primary and secondary crushing, the rock is ground in ball or roller mills. Separation of these mixtures may be achieved by froth flotation since the talc has a tendency to float from the impurities. Magnetic separation is used to further purify the talc. The talc slurry is then filtered, dried and may be further ground depending on its particle size.

V WASTEWATER

The common sources of wastewater at industrial minerals plants are:

- the mine and its associated facilities, and
- manufacturing facilities.

The mining operation typically requires dewatering in order to permit further extraction and excavation activities. Water collects in the pits or mines as a result of groundwater seepage, precipitation and storm run-off. As a result of the excavation and comminution equipment, the creation and dispersion of particulate matter affects the quality of the water primarily with respect to suspended solids content. Due to the operation and maintenance of heavy equipment, oil and grease may be a potential contaminant.

The manufacturing facilities are generally involved in production processes which do not substantially modify the chemistry of the initial raw materials. The purpose of the heating and mixing processes carried out in kilns are generally intended to remove the water of crystallization and carbon dioxide, and to promote solid state reactions. The primary function of water usage in these facilities is non-contact cooling water and dust suppression.

Conventional parameters which are most likely to be identified in wastewaters generated by this sector include: pH, suspended solids, oil and grease. Toxic pollutants (organic or inorganic) are not generally expected to be present in wastewaters.

For the purposes of the Effluent Monitoring Regulation, the effluents within the IM Sector were classified according to the effluent source and potential for contamination.

In the **Effluent Monitoring Regulation,** :

- effluent discharged from a manufacturing or processing plants is called, "**cement plant effluent**","**lime plant effluent**", "**graphite plant effluent**", "**gypsum plant effluent**", or "**magnesium plant effluent**"; and
- underground minewater is called "**minewater effluent**";
- quarry water is called "**quarry water effluent**";
- run-off from storm events which is collected and discharged through a drainage system such as a culvert or open channel, is called "**storm water effluent**"; and
- wastewater which is generated from the washing of sand or stone, is called "**wash water effluent**".

i. CEMENT PLANT EFFLUENT

The operations where the largest volumes of water are used in cement plants are essentially non-polluting. Process water in wet plants is evaporated. The major use of water at most cement plants is for cooling. This water is used to cool bearings on the kiln and grinding equipment, air compressors, burner pipes and the cooling of cement prior to storage or shipment.

While cooling water is mostly non-contact, it can become contaminated to some extent through poor water management practices. This contamination may include oil and grease, suspended solids, and even some dissolved solids. If cooling towers are used, blowdown discharges may contain residual algicides.

All cement plants have some accumulation of settled dust on the plant property and this dust may show up in the wastewater in a number of ways. Many plants spray water on the roads to prevent the dust from becoming airborne by truck traffic. Most plants also routinely wash accumulated dust off the trucks. The amount of water used for these purposes varies widely. Some of this water inevitably evaporates, but depending on the topography of the site, some of this water may drain into storm sewers or natural waterways.

Water from surface run-off after rain may also be laden with the dust that accumulates on the plant site. Run-off from dust piles, coal piles, and raw material piles may also become contaminated. Plants with boilers, cooling towers, and intake water-treatment facilities, have blowdown and backwash discharges associated with these operations.

At some plants, raw materials are washed and at others the raw materials are enriched by a beneficiation process. These processes may result in wastewater discharges containing suspended solids.

Where an active or abandoned quarry is used as a receiving basin for dust disposal or plant wastewater, the discharge from the quarry may be contaminated with wastes associated with cement manufacturing.

ii. LIME PLANT EFFLUENT

In general, lime plants have limestone quarries on site and their main source of water is the quarry water . In one particular case, limestone is shipped across the Great Lakes to the plant site.

Water is used mainly for cooling kiln bearings at these plants. Though the cooling water is mainly non-contact, it may become contaminated with oil ,grease and dust from the operation of heavy machinery and equipment.

Two methods are used to control dust from kiln gases before they are discharged to the atmosphere - electrostatic precipitation and wet scrubbing.

Wet scrubbers constitute a major portion of water usage at some plants. Plants that use wet scrubbers employ turbulent contact absorption of the carbon dioxide evolved during the calcination process. This practice neutralizes the otherwise highly alkaline scrubber effluent.

iii. GRAPHITE PLANT EFFLUENT

The sources of wastewater from the mining and benefication of graphite ore include:

- water which collects in the quarry (quarry water effluent);
- water used at the plant site (graphite plant effluent); which is comprised of (1) water used for slurrying the milled ore to effect separation by flotation; as well as,

(2) non-contact cooling water for plant equipment (i.e. milling equipment, compressors, vacuum pumps), and

- storm run-off from waste rock piles (storm water effluent);

The graphite plant effluent is routed to what is known as a tailings pond for treatment prior to being released. This also may include water which is pumped from the quarry during dewatering.

Since the ores from this category may be acid-producing, the tailings pond may serve as a neutralization basin (through the addition of limestone), in addition to a sedimentation pond.

iv. GYPSUM PLANT EFFLUENT

There are two main areas where water is used or collected at gypsum plant sites:

- the mine (minewater effluent);and
- the mill and manufacturing plant (gypsum plant effluent).

Mine dewatering is discussed under the heading of minewater effluent.

Water usage in the production of gypsum involves the following operations, depending on the plant:

- primary and secondary crushing;
- screening and washing;
- heavy media separation (sink and float);
- washing;
- processing of "float" gypsum; and
- stockpiling of "sink" dolomitic limestone.

Crushing usually takes place in the mine and grinding at the mill. One of the uses of water includes non-contact cooling water for the comminution equipment.

One plant uses heavy media separation (sink and float) to beneficiate impure gypsum prior to processing. Magnetite and ferro-silicon are used as the separation media, with recycle of the media.

In the manufacturing plant, a complete range of gypsum plasters and wall boards are produced. Water is driven off as steam during calcination in the kilns or during wall board drying in the ovens.

Gypsum plant effluent is made up of wastewater from the mill and run-off from the plant site.

v. MAGNESIUM PLANT EFFLUENT

There are three main areas where water is used and/or produced at a magnesium metal plant site. These include the quarry, the calcination plant and the reduction plant.

The quarry is dewatered to prevent flooding due to ground water seepage and storm events. The mining practices conform with conventional surface mining and thus may be classified as quarry water effluent.

The water usage at the calcination and reduction areas is primarily non-contact cooling water for manufacturing equipment. This water is released through open channels and may be considered as potentially contaminated cooling water. It is classified as Magnesium Plant Effluent.

vi. MINEWATER EFFLUENT (underground mining)

Minewater is primarily the result of natural surface water that percolates into underground mine workings. This effluent type appertains to the Gypsum and Talc categories since these are the only mining operations in the IM Sector which are active in underground mining. In addition to natural water influents, water is pumped underground for mining purposes. For instance, water is used underground for drilling, dust suppression, pumping, cooling and sanitation.

The natural water that percolates into an underground mine and the water that is deliberately pumped underground for process use comes into contact with the mineralized rock. This water must be removed from the mine to prevent flooding. The water is therefore collected in one or more sumps and is pumped to the surface. This water, while it is resident in the mine, is contaminated by the mining process itself. It may contain quantities of mine-machinery lubricants, trace quantities of various explosives, rock-fines, mine-water treatment chemicals, and traces of all the chemical materials that are used in and around the mine.

vii. QUARRY WATER EFFLUENT (surface mining)

Mineral aggregate mining operations require adequate sources of water for use in many stages of processing. Water may be used for the separation of materials, to settle dust, and for cleaning the final product. Non-potable water is acceptable for any of these purposes and water obtained from wells, surface run-off or any accessible groundwater may be used.

Many plants develop their own water supply on site through excavation of aggregate deposits which lie below the water table. Water is usually recycled to storage or settling ponds and occasionally will be discharged to surface watercourses after settling.

As some sand and gravel pits and limestone quarries operate below the water table, extensive dewatering of the site is carried out continuously or intermittently to prevent flooding of working areas.

viii. STORM WATER EFFLUENT (run-off)

Typically, plants in the IM Sector do not have a separate collecting system for storm water. Consequently storm water is usually included as a component of one of the other effluent streams.

Rain and snow fall directly into open pits and quarries. In the case of most gravel pits, this source of water disappears into the groundwater system or evaporates. Clay and shale pits, and quarries are mostly impermeable, thus mine dewatering after storm events (rainfall and spring thaw) is extensively practised.

The storm water which collects in quarries makes up part of the quarry water and is therefore classified as a quarry water effluent.

Water which collects in Clay and Shale pits is not exposed to processing operations and is therefore classified as storm water effluent even though it is discharged as required, by pumping.

ix. WASH WATER EFFLUENT (pits and quarries)

Aggregates for use in the construction industry are made available as washed product. This includes sand and gravel recovered from pits, as well as crushed stone from quarries.

The washing operation generally involves the use of vibrating or rotating screens and water to clean the aggregates. Any accessible ground water or surface run-off may be used for washing. As a common practice, the wash water is discharged to a series of settling ponds and the clarified water is reused.

Washing is the only significant use of water at sand and gravel sites. Most of the sand and gravel sites employ 100% recycle of their wash water. Additionally, some wash water and surface run-off penetrates through the porous sand and gravel beds and re-enters the ground water system. Subsequently, a very small percentage of the Sand and Gravel sites discharge wash water effluent to surface waters. In the case of quarries, excess water may result from washing operations since water drainage is limited due to impervious ground conditions.

In general, wash water effluents are made up of wastewater from washing operations and may include a combination of excess ground water and surface run-off.

VI IN-PLANT CONTROLS

The volume of wastewater produced by the IM Sector may be reduced primarily through the use of water recycle. Recycling of water is widely practised, mainly by aggregate producing plants in this sector. Most sand and gravel pits with washing facilities have attained zero effluent discharge due to recycling.

The manufacturing plants also have the opportunity to reduce effluent discharge by recycle of cooling water. 100% recycle of cooling water has been implemented at one cement plant.

In some gypsum plants a portion of the minewater from gypsum mines is used as intake water for the processing plant. This water is subsequently lost through evaporation during the production of gypsum wallboard.

With respect to mining operations, groundwater seepage into mines and pits may be reduced through the application of periphery wells. Water may be pumped from wells which are installed in appropriate locations surrounding the mining site. This technique is used as a means of intercepting groundwater seepage into the mine, and thus preventing contamination of those waters on the site.

VII WASTEWATER TREATMENT

Wastewater treatment using sedimentation ponds for suspended solids control is the standard practice for the Industrial Minerals Sector. Often, a series of ponds is used, with the first pond (primary settling) collecting the heavy load of easily settled material and the other ponds (secondary, tertiary) providing additional solids removal to achieve the desired suspended solids level. As the ponds fill with solids, they can be dug out or dredged to remove these solids or they may be left filled and new ponds installed.

Materials mined and processed in this sector are generally alkaline and non-acid producing. In the case of manufacturing lime from limestone or dolomite, high alkaline effluents could be produced. Alkalinity is controlled by use of in-situ production of carbonic acid (a by-product of the calcination process) or by adding purchased sulfuric acid.

VIII SECTOR OVERVIEW

i Cement Category

Number of Plants: 6

Effluent Type:
- quarry water effluent
- cement plant effluent
- storm water effluent

Products: Portland Cement -
mixture of; $3CaO.SiO_2$, $2CaO.SiO_2$ 2
$3CaO.Al_2O$, $3CaO.Al_2O_3.Fe_2O_3$

Uses: Building and construction industry.

Wastewater Treatment: Sedimentation ponds for control of suspended solids.

ii Chemical Lime Category

Number of Plants: 6

Effluent Type:
- lime plant effluent
- storm water effluent

Common Minerals:

i) calcite : $CaCO_3$
ii) magnesite: $MgCO_3$
iii) dolomite: $(Ca,Mg)CO_3$

Mining Methods: Open Pit

Processing Methods: crushing, grinding, classification, calcination and sometimes washing

Uses: Aggregates, chemicals.

Wastewater Treatment: Sedimentation ponds for control of suspended solids. Effluents are always basic. Turbulent contact absorption of CO_2 for neutralization of high alkaline wastewater.

iii Clay and Shale Category

Number of Plants:	5
Effluent Type:	- storm water effluent
Common Minerals:	
mixture of:	SiO_2, Al_2O_3, Fe_2O_3, CaO, MgO, K_2O, TiO_2
Mining Methods:	Open Pit
Processing Methods:	crushing, grinding, and classification.
Uses:	Clay bricks, drainage tiles, sewer pipe, roofing tiles, and flue liner.
Wastewater Treatment:	Sedimentation ponds for control of suspended solids.

iv Graphite Category

Number of Plants:	2
Effluent Type:	- graphite plant effluent - storm water effluent
Common Minerals:	C (mineral form of elemental carbon)
Mining Methods:	Open Pit
Processing Methods:	crushing, grinding and flotation.
Uses:	electrodes, lubricant, refractory
Wastewater Treatment:	Sedimentation ponds for the control and removal of suspended solids, and neutralization with lime if acidic effluent is produced.

v **Gypsum Category**

Number of Plants:	3
Effluent Type:	- minewater effluent - gypsum plant effluent - storm water effluent
Common Minerals:	$CaSO_4.2H_2O$
Mining Methods:	Underground mining.
Processing Methods:	Crushing, grinding and/or heavy media separation, heat treatment.
Uses:	Wallboard, plaster of paris, additive to cement.
Wastewater Treatment:	Sedimentation ponds for the control and removal of suspended solids.

vi **Magnesium Category**

Number of Plants:	1
Effluent Type:	- quarry water effluent - magnesium plant effluent - storm water effluent
Common Minerals:	
i) Dolomite:	$(Ca,Mg)CO_3$
Mining Methods:	Open Pit
Processing Methods:	Crushing, Calcination and reduction.
Uses:	Mg metal -alloys (aircraft industry. aluminum cans)
Wastewater Treatment:	none

vii Quarries Category

Number of Plants:		100
Effluent Type:	-	quarry water effluent
	-	wash water effluent
	-	storm water effluent

Common Minerals:

i)	calcite :	$CaCO_3$
ii)	magnesite:	$MgCO_3$
iii)	dolomite:	$(Ca,Mg)CO_3$
iv)	nepheline syenite:	$(Na,K)\ AlSiO_4$

Mining Methods:	Open Pit
Processing Methods:	crushing, grinding, classification, and sometimes washing
Uses:	
Nepheline syenite:	Glass making, ceramics, extenders, pigments.
Limestone/dolomite:	Aggregates, chemicals.
Wastewater Treatment:	Sedimentation ponds for control of suspended solids.

viii Sand and Gravel Category

Number of Plants:		6
Effluent Type:	-	wash water effluent
Common Minerals:		mixture of; SiO_2, Al_2O_3, Fe_2O_3, $CaCO_3$, $MgCO_3$, $(Ca,Mg)CO_3$
Mining Methods:		Open Pit
Processing Methods:		crushing, grinding, classification, and sometimes washing
Uses:		Building and construction industry.
Wastewater Treatment:		Sedimentation ponds for control of suspended solids.

ix Talc Category

Number of Plants:	2
Effluent Type:	- minewater effluent - quarry water effluent - storm water effluent
Common Minerals:	$3MgO.4SiO_2.H_2O$
Mining Methods:	Open pit and underground.
Processing Methods:	Crushing and grinding.
Uses:	Talcum powder, ceramic ware, paper manufacturing (pitch control), filler (paints), filler and extender in plastics, roofing and rubber products.
Wastewater Treatment:	Sedimentation ponds for the control and removal of suspended solids. Effluent from talc mines may contain fibrous chrysotile.

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PART B

TECHNICAL RATIONALE
FOR THE
MONITORING REQUIREMENTS

I INTRODUCTION

The purpose of the technical rationale section is to explain the steps in the development of the Ontario Mineral Industry: Group B, Industrial Minerals Effluent Monitoring Regulation.

The section provides background information on the regulation process, the options considered in arriving at the specific monitoring approach for the plants in this sector. It also provides background information on the rationale used to select parameters and the frequency at which they shall be monitored.

II DEFINITION OF THE INDUSTRIAL MINERALS SECTOR

The Industrial Minerals (IM) sector comprises mining and processing of non-metallic minerals and structural materials. To define the IM Sector, each product category must be taken into consideration due to the diversity of ores mined and products manufactured.

One approach is to use the Standard Industrial Classification (SIC) codes originally established in Canada for data gathering purposes by Statistics Canada (1). These codes classify establishments by type of activity.

SIC codes used in Canada that correspond to the categories that make up the IM Sector are as follows:

Category	**SIC Code**
Cement	3521
Chemical Lime	3581
Clay and Shale	0815, 3511
Graphite	0629, 3295
Gypsum	0623, 3593
Magnesium	0619, 3591
Quarries	0811, 0812
Sand and Gravel	0821
Talc	0629, 3295

III THE NEED FOR REGULATION

The majority of plants in this sector are situated near major population centers in the province, and are primarily found in Southern Ontario. These plants discharge wastewaters to natural watercourses which are sources for drinking water, irrigation and animal husbandry.

Only about 3% of the licensed pits and quarries and associated manufacturing plants discharge wastewaters to natural watercourses. Effluents from these sites are discharged directly or indirectly to either the Great Lakes or Arctic watersheds.

Currently, there is minimal control on wastewater discharges from this sector. Out of the approximately 130 dischargers in the IM Sector, only one of the cement plants and one of the talc plants currently monitor for conventional parameters, under the Ministry of the Environment's Industrial Information System (IMIS) (2). MOE, however, deals with some of the plants in the sector on a regional basis but are not entered into IMIS.

The Ministry water management guidelines are summarized in the publication entitled "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment" (3), referred to as the Blue Book. Provincial Water Quality Objectives (PWQOs) are currently available for a total of 74 pollutants including 51 EMPPL substances. It is the goal of the Ministry to:

- establish PWQO or Guidelines for all of the Effluent Monitoring Priority Pollutants List (EMPPL) substances that possess the potential for moderate to high aquatic environmental damage;
- assemble the available aquatic toxicological and other appropriate information for the remaining EMPPL substances, and maintain the capability to set Provincial Water Quality Guidelines for such substances on demand.

There are currently no regulations for specific, toxic and persistent pollutants, generally termed "priority pollutants". In fact, there exists only a very limited database on the concentrations and loadings of these priority pollutants being discharged into Ontario's waterways. Most sector plants have virtually no data on the concentration of these pollutants in their effluents.

Due to the deficiency of data there is a need for a comprehensive database on the discharges of conventional and priority pollutants from the IM Sector plants. The MISA effluent monitoring regulation for the IM Sector will provide this database.

The effluent limits regulation will be developed for the IM Sector on the basis of the monitoring database in conjunction with data on Best Available Technology Economically Achievable (BATEA) and Ministry water quality objectives.

IV THE MINISTRY /INDUSTRIAL MINERALS SECTOR DIALOGUE

The Ministry adopted an open consultative process with industry in developing the IM Sector Effluent Monitoring Regulation. Additional input in the Regulation formulating process was provided by the MISA Advisory Committee (MAC). The MISA Advisory Committee is a panel of qualified professionals and environmentalists established to provide a third opinion to the Minister on regulations developed by the joint efforts of industry and the Ministry before and after they are released for "public" review.

A Joint Technical Committee (JTC) consisting of Industry, Ministry of Natural Resources, Ministry of Northern Development and Mines, Ministry of Transportation, Environment Canada, and Ministry of the Environment representatives served as the means for reaching a compromise. A member of the MISA Advisory Committee also took part in the JTC discussions.

Agreement was reached with industry on principles which were to serve as general guidelines for the monitoring regulation. A multi-discipline group of the Ministries/Environment Canada experts developed the general rationale for the specific monitoring requirements. A joint Government/Industry Regulation Writing team then produced the Regulation text for review by the JTC.

On the basis of the rationale and the databases available to the Ministry, draft monitoring requirements were compiled. The monitoring requirements were then reviewed and modified as required.

V THE REGULATORY APPROACH

The simplest monitoring approach both for implementation and regulation would have been to have a uniform requirement for all of the sites (approximately 130) that make up the IM Sector. Differences in products, effluent contaminants and treatment processes, made it impossible to establish monitoring requirements that would be all-encompassing and yet be equitable for all plants.

As an alternative to the overall generic approach for the entire sector, the industries were categorized. A generic effluent monitoring schedule was prepared for each of the following categories;

(i) cement,
(ii chemical lime,
(iii) clay and shale,
(iv) graphite,
(v) gypsum,
(vi) magnesium,
(vii) quarries,
(viii) sand and gravel, and
(ix) talc.

The unique nature of each category is derived from a combination of differences that involve mineralogy, methods of mining, methods of processing, products and effluent contaminants.

The Industrial Minerals Sector Regulation contains nine category specific monitoring schedules which are included in Schedule A . The effluent streams which the direct discharger must monitor depend upon the category under which the operation is grouped. The effluent streams within each category were classified based on the following items:

- The nature of the processes contributing to the wastewater stream;
- The expected characteristics of the wastewater stream; and
- The magnitude and potential environmental impact of the wastewater stream.

VI DATABASES USED FOR PARAMETER SELECTION

The major source of information on the presence and concentration of conventional and priority pollutants in the IM Sector effluents was the pre-regulation effluent characterization data. Data from existing Ministry and industry records were also considered. U.S. EPA data on cement plants and mineral mines were also used for comparison.

Best professional judgement (BPJ) based on knowledge of process chemistry, products, by-products and raw materials for each category was also important in parameter selection.

VII THE U.S. EPA EXPERIENCE

The Industrial Minerals Sector comprises two distinct sectors under the U.S. EPA categorization; Mineral Mining and Processing, and the Cement Manufacturing Sectors. The Mineral Mining Sector is further categorized according to the SIC designations.

The U.S. EPA has published Development Documents for Effluent Limitations Guidelines and New Source Performance Standards for Mineral Mining (4,5) and the Cement Manufacturing Point Source Categories (6).

Under these guidelines, it has been established that the "Best Available Technology Economically Achievable" (BATEA) for toxic pollutants is the "Best Practicable Technology" (BPT). BPT facilities comprise direct discharge point source with end-of-pipe treatment consisting of settling ponds. In some cases, (some cement plants and chemical lime plants) end-of-pipe treatment includes neutralization by the addition of mineral acids such as sulfuric acid.

In developing its effluent limitations guidelines and standards for toxic pollutants, EPA originally addressed a list of 129 pollutants, referred to as the "priority" pollutants list. This list was developed in the late 1970's.

Extensive sampling and analyses programs were undertaken for the two categories using 35 parameters for the Cement Manufacturing category and 18 parameters for the Mineral Mining category. Effluent limits were imposed on the two sectors for the following parameters:

Cement Manufacturing

- pH
- Total Dissolved Solids
- Total Suspended Solids
- Alkalinity and Acidity
- Potassium
- Sulphate
- Temperature (heat)

Mineral Mining

- pH
- Total Suspended Solids

Trace elements (lead, mercury, nickel, chromium, cadmium, arsenic, antimony, zinc, and iron) were found to be present at low or below detectable levels. These metals, as well as any chrysotile fibers, could be effectively reduced by removal of suspended solids using settling ponds.

No plants were identified that were forced to discontinue production due to increased cost of operation resulting from regulatory compliance with the U.S. EPA program.

VIII PRE-REGULATION MONITORING

A voluntary pre-regulation monitoring program was established in order to obtain a preview of effluent characteristics within the sector. The program was carried out in the last quarter of 1988. In-keeping with the U.S. EPA approach of monitoring and sampling of representative sites, mining and processing facilities were selected from each of the categories.

In total, the pre-regulation monitoring program covered 20 industrial sites. The following list provides a breakdown of the number of sites tested within each category.

Category	**No. of Sites**
Cement	1
Chemical Lime	4
Clay & Shale	3
Gypsum	2
Quarries	5
Magnesium	1
Sand & Gravel	3
Talc	1

The samples were collected from the outfall or final discharge point of each stream classification. Typically, a total of three rounds of sampling were conducted at each site; two by private laboratories and one by the MOE lab. Samples were analyzed for the full set of conventional parameters and EMPPL compounds, with the exception of analytical test groups 11;(chromium hexavalent) , 15;(sulphide), 21;(herbicides), 22;(pesticides)and 26;(fatty and resin acids). Open characterizations on organics and metals were also included in the analyses.

Parameters that exceeded MOE Method Detection Limit (MDL) and the frequency of detection are shown in Tables 1 and 2.

IX DATABASE REVIEW AND DISCUSSION

The parameters most relevant to the IM Sector that were identified as the result of the pre-regulation monitoring were pH, suspended solids, and oil and grease (solvent extractables), Tables 1,2, and 3.

The parameters regulated by the National Pollution Discharge Elimination System (NPDES) of the U.S. EPA for the Cement

Manufacturing and Mineral Mining and Processing categories were pH, alkalinity, acidity, suspended solids, and total dissolved solids. The results from plant surveys conducted by the MOE and U.S. EPA were found to be essentially the same.

The ecological effects of the parameters found by MOE and U.S. EPA are discussed below:

pH

The range of pH for all samples taken during the pre-regulation monitoring phase varied from 7.4 to 8.4 (Table 2). These levels of pH are nearly optimum for all uses, including municipal, industrial and irrigation water supplies and for recreational uses.

A potential beneficial effect of sector effluents is the buffering capacity, especially in streams impacted by acid mine drainage (metal mines) or acid rain.

Total Suspended Solids

Pre-regulation results for total suspended solids are shown in Table 3.

According to U.S. EPA (4) suspended solids concentration up to 25 mg/L offers high level of protection to aquatic communities. 25 mg/L to 80 mg/L offers moderate level of protection and 80 mg/L to 400 mg/L offers a low level of protection. Over 400 mg/L suspended solids concentration offers very low level of protection.

Thus effluent discharges from all plants, except the cement category, provide moderate to high level of protection for aquatic life.

It must however, be emphasized that continual impact of sediments into a receiving body of water could cause shifts in the abundance of fish and the aquatic community structure.

Heavy Metals and Arsenic

Effluents discharged from some plants in the IM sector enter the municipal drinking water supply system for population centers in Southern Ontario. Important water quality parameters that cause toxicity and objectionable taste were therefore examined.

Lead, mercury, nickel, chromium, cadmium and selenium are all toxic to humans above certain levels. Other elements which are controlled for the protection of aquatic life include arsenic, beryllium, copper, iron, silver and zinc (3). Table 4 summarizes the pre-regulation monitoring results for heavy metals. In addition, the results are compared with the Provincial Water Quality Objectives

(PWQO's) for the protection of aquatic life as well as Ontario Drinking Water Objectives, Maximum Acceptable Concentration. Maximum Desirable Concentration related to aesthetic quality are presented for copper, iron and zinc.

PWQO's are based on total concentration of unfiltered water sample except mercury which is filtered sample.

Undissolved iron and zinc are generally non-toxic to humans but result in objectionable taste. Zinc is toxic in solution and is persistent in sediments (4).

The metal concentrations in the various effluents are either extremely low and were not detected or relatively low and are generally below PWQO's for aquatic life protection and drinking water standards. Cadmium, copper, iron and zinc were the only elements reported above the PWQO's. It is believed that the metal concentrations above the criteria were as the result of particulate system in the effluents. These particulates will settle during treatment (settling ponds) and the metal concentration will decrease significantly as indicated by the results of quarries and sand and gravel plants that have settling ponds.

Nitrates

Nitrate levels of receiving streams may be affected by plants in this sector. Ammonium nitrate is a component of explosives used in most quarry and underground mining operations. Improper storage or incomplete combustion of the compound could result in increased levels of nitrates in surrounding streams. Pre-regulation results shown in Table 5, indicate that nitrates are not expected to be a concern in the Industrial Minerals Sector plants.

The Maximum Acceptable Concentration (MAC) for nitrates as nitrogen (PWQO, Drinking Water Objectives) is 10 mg/L. All the categories reported values at or below MAC. The nitrate level reported could be attributed to agricultural run-off.

Effluent Monitoring Priority Pollutants List (EMPPL) Organics

Out of the twenty sites sampled during pre-regulation monitoring, EMPPL organics were detected at only two sites. Trichloroethylene (ATG 16) was detected once out of two sampling rounds in 3M quarry water effluent. Extractables, Acid Phenolics (ATG 20) were detected in the Reiss Lime effluent. Only one sample was taken at Reiss Lime.

The open characterization for volatiles and extractables (ATG 28 a & b) revealed no additional compounds present at 10 ppb. The number of open characterizations and dioxins analyses performed by industry and the Ministry for each category is shown in Table 6.

X CLASSIFICATION OF EFFLUENTS

The industries within the IM Sector engage primarily in physical processing. The IM Sector comprises mining, and in some cases manufacturing, using naturally occurring non-fuel minerals and rocks. The materials include gypsum, silica, limestone, talc, dolomite, nepheline syenite, traprock, clay and shale.

Process water, within the meaning of the General Regulation, is not produced by any of the IM Sector plants. Subsequently, the wastewater originating from any of the sector manufacturing facilities is considered on a category-basis.

Plant effluents are classified under the categories of;

(a) cement plant effluent,
(b) graphite plant effluent,
(c) gypsum plant effluent,
(d) lime plant effluent, and
(e) magnesium plant effluent.

The effluents are derived from the respective manufacturing sites. These effluents consist primarily of non-contact cooling water for crusher bearings, dryers, kilns, pumps and air compressors. Other sources of wastewater such as water used for dust suppression or dust removal may also be included.

Water which is discharged as a result of the dewatering of mines includes;

(f) minewater effluent, and
(g) quarry water effluent.

Water from underground mines is categorized as minewater effluent and water originating from open pit mining (quarries) is categorized as quarry water effluent. The primary source of water within this grouping is groundwater seepage and storm water run-off. Quarry water is considered under its own classification, rather than as storm water effluent since the water may become contaminated (e.g. suspended solids) during physical processing operations such as crushing and/or classification of aggregates.

The remaining two effluent categories are;

(g) storm water effluent, and
(h) wash water effluent.

Storm water effluent includes any run-off from storm events which is contained within its own collecting system such as a culvert or open flow channel. Since clay and shale sites are basically non-porous, water from storm events or spring thaw does not drain. Subsequently, water which is pumped from the pits consists only of storm water and because the mining operation involves only excavation and no blasting, comminution or washing, it is classified as storm water.

Wash water effluent is associated with the sand and gravel pits and some quarries. The effluent from quarries and sand and gravel pits which are involved in the washing of aggregates and do not employ 100% recycle of wash water will fall into this category.

XI PARAMETERS FOR MONITORING

The priority pollutants assigned for monitoring of effluents in the IM Sector were taken directly from the Ontario Effluent Monitoring Priority Pollutants List (EMPPL).

The derivation of the EMPPL is fully documented in a Ministry report dated July 1987 (7). The EMPPL includes chemicals detected in Ontario municipal and industrial effluents and Ontario's waterways which pose a hazard to the receiving environment because of their toxicity and persistence. The potential presence of a chemical based on use and manufacturing data could also have placed it on EMPPL.

With the release of "The Effluent Monitoring Priority Pollutants List - 1988 Update" (8) in March 1989, the current EMPPL contains 266 chemicals. This total includes the original 179 parameters from the 1987 EMPPL and an additional 87 parameters from the 1988 EMPPL update. The additional parameters were assessed for hazard under the same criteria as the original EMPPL compounds.

Of the 266 chemicals on the current EMPPL, only 141 have validated analytical protocols. Consequently, only 141 of the EMPPL compounds were considered for monitoring in the development of the IM Monitoring Regulation.

As new chemicals are identified in Ontario effluents and waterways, they will be assessed under the EMPPL criteria on an ongoing basis and, if warranted, placed on the EMPPL.

For each category in the IM Sector, effluent monitoring schedules were developed. Conventional as well as priority pollutants were assigned for monitoring on the basis of their presence and their concentrations in the respective site effluents as determined from historical and current monitoring data available to the Ministry. In addition, supplemental data on raw materials, by-products and products were also used for parameter assignments.

The only compounds, chemicals or substances deleted from the EMPPL for the purposes of IM Sector monitoring were as follows:

(i) Chemical Oxygen Demand (Group 1) (COD);

Dissolved Organic Carbon (DOC) is being measured as it offers a much lower detection limit of 0.5 mg/L over COD at 10 mg/L. Also DOC is more likely to reflect trace organics than COD, BOD5 or TOC.

(ii) Total alkyl lead (Group 13);

Not found during pre-regulation monitoring and not used or manufactured by sector plants.

(iii) Volatiles, Water Soluble (Group 18);

Not found during pre-regulation monitoring and not used or manufactured by sector plants.

(iv) Extractables, Phenoxy Acid Herbicides (Group 21);

Not used or manufactured by sector plants.

(v) Extractables, Organochlorine Pesticides (Group 22);

Not used or manufactured by sector plants.

(vi) Extractables, Neutral Chlorinated (Group 23);

Not found during pre-regulation monitoring and not used or manufactured by sector plants.

(vii) Fatty and Resin Acids (Group 26);

Not used or manufactured by sector plants.

In addition to chemicals found on the current EMPPL, sector plants will be doing open characterizations on organic and inorganic elements or compounds that lie outside of the EMPPL and will carry out monitoring for substances that are somewhat specific to the sector. These include chlorides, fibrous chrysotile, fluoride and sulphates.

The IM Sector List also contains analytical test groups 24;(dioxins/furans) and 27;(PCBs). These compounds were also not found during pre-regulation monitoring. However, because of the importance of group 24 on the EMPPL list, it will be tested for at least once over the pre-regulation and regulation monitoring periods. If PCBs are used or stored, or where kilns are used for the incineration of garbage or solvents, then those plants must analyze for PCBs on a semi-annual basis.

All of the parameters which are monitored in the IM Sector are listed in Schedule B.

Included in the effluent monitoring schedules were requirements for toxicity testing using both the fish (Rainbow Trout) and Daphnia magna acute lethality toxicity tests on all discharges from all sector plants.

XII PARAMETER/FREQUENCY ASSIGNMENT - GENERAL COMMENTS

The objectives of the Industrial Minerals Sector MISA monitoring program are to;

(a) accurately quantify the concentrations and mass loadings of those contaminants for which limits will be imposed,

(b) estimate the concentrations and mass loadings of contaminants that are suspected to be present,

(c) identify and semi-quantify the concentrations and mass loadings of other toxic compounds that may be present, and

(d) evaluate the toxicity of effluent from the IM Sector.

The parameters and monitoring frequencies were selected to satisfy the goals of the MISA program using the following criteria as guidelines.

Five basic frequencies of monitoring are required in the Minerals Sector Regulation - thrice weekly, weekly, monthly, semi-annually and annually.

The monitoring requirements fall into two basic categories. These include Routine Monitoring and Characterization Analyses. Routine Monitoring includes the collection and analyses of samples on a thrice weekly, weekly and monthly basis. Characterization analyses are to be carried out on a less frequent basis (i.e. semi-annually or annually).

All parameters which were found during the pre-regulation monitoring program were selected for monitoring at some frequency. The monitoring frequencies were assigned according to the parameter type, the parameter concentration and the desired information needs.

Monitoring for a very limited number of parameters will be required on a site specific basis at a monthly frequency based on results from pre-regulation monitoring or factors associated with site operations .

Characterization analyses will be required to determine the presence/absence of other toxic compounds. This regulation specifies annual or semi-annual characterizations per effluent for determining presence/absence of contaminants. These frequencies, in conjunction with pre-regulation monitoring and the agreement among plants in each category to share characterization data, ensure that if a compound is present 50% of the time in sector effluents, it will be identified with a probability of greater than 99% (Table 7).

Based on the general considerations discussed above, the following parameter/frequency assignment was arrived at:

(i) Thrice weekly; pH, total suspended solids (TSS), oil & grease (solvent extractables).

(ii) Weekly; pH, TSS, oil & grease for quarries and sand and gravel plants with settling ponds.

(iii) Monthly; Ammonia plus ammonium, nitrate plus nitrite, cadmium, copper, arsenic, phenolics (4AAP), oil and grease, and fluoride.

(iv) Semi-annually or annually; characterization monitoring parameters in Schedule B.

XIII PARAMETERS/FREQUENCY ASSIGNMENT-ROUTINE MONITORING

i. PARAMETERS FOR THRICE WEEKLY MONITORING

These parameters were selected to establish an adequate baseline water quality level for existing water systems. The parameters selected are total suspended solids, oil and grease (solvent extractables) and pH. These parameters were assigned on a frequent routine monitoring basis for all of the categories within the IM sector.

Total suspended solids provides a gross measure of suspended material including volatile suspended solids (organic) and inorganic materials. The organic fraction may include grease, oils, fibers and dispersed insoluble organic compounds. Inorganic materials include sand, silt, clay and insoluble metal compounds. Suspended solids may also be a substrate for toxic contaminants which can leach out in water.

Oil and grease (solvent extractables) gives a measure of the gross hydrocarbon content in the effluent. Substances measured may also include fatty acids, soaps, fats, oils and waxes.

pH and pH shifts may alter toxicity of many materials to aquatic life. High pH trends may make soluble metals dissolve from sludges and bottom sediments.

Thus, these parameters address three major areas - inorganic metals, organic materials and toxicity.

The reasons for selecting certain routine parameters and a short description of what is measured under each test are summarized in point form.

PH

- measure of the hydrogen ion concentration;
- fundamental parameter which indicates the acidity level in an effluent;
- pH and pH changes may alter the toxicity of many materials to aquatic life;
- pH impacts the availability of nutrients for plants;
- low and high pH values cause corrosion and may make soluble metals dissolve from sludges and bottom sediments;
- PWQO require pH to fall within the range of 6.5 - 9.5 (receiving waters).

Total Suspended Solids (TSS)

- gross measure of suspended material including volatile suspended solids (organic) and inorganic materials;
- organic fractions may include grease, oils, fibers, microorganisms and dispersed insoluble organic compounds;
- inorganic materials include sand, silt, clay and insoluble metal compounds;
- measure of the effectiveness of treatment system separation equipment;
- may be a substrate for toxic contaminants which can leach out in water;
- may increase turbidity of water reducing recreational value;
- may impair photosynthetic activity of aquatic plants;
- can form sludge banks on settling leading to localized anaerobic conditions;
- may kill fish by clogging gills.

Oil & Grease (Solvent Extractables)

- measure of the gross hydrocarbon that could produce a visible film, sheen or discoloration on the surface of a watercourse;
- substances measured may include hydrocarbons, fatty acids, soaps, fats, oils and waxes;
- measure of groups of substances whose common characteristics is their solubility in methylene dichloride;
- can cause tainting of edible aquatic organism;
- can cause odour and taste problems in drinking water;
- may form deposits on shorelines and bottom sediments;
- oil slicks prevent the full aesthetic enjoyment of water;
- can be a carrier for other toxic contaminants;
- fish and water fowl are adversely affected by oils;
- crude oil at 0.3 mg/L can be toxic to freshwater fish.

ii. PARAMETERS FOR WEEKLY MONITORING

The weekly routine monitoring frequency applies to the Quarries and Sand & Gravel categories. For those plants that have settling ponds in place, with a minimum calculated retention time of 24 hours, the routine monitoring requirement for thrice weekly monitoring was reduced to weekly monitoring. The parameters selected are the same as those selected for thrice weekly monitoring; only the frequency of monitoring is changed.

The rationale for reducing the monitoring frequency requirement is summarized as follows.

In total, there are over 100 plants in the Quarries and Sand & Gravel categories. Most of the plants currently have settling ponds with retention times varying from 24 hours to several months. Based on data from pre-regulation monitoring, the use of these settling ponds is expected to reduce the variability of data. Results showed that total suspended solids in wash water or quarry water from sites with settling ponds varied from ND to 12 ppm and the sites without settling ponds or with settling ponds that did not have adequate retention time for the solids to settle (i.e. 24 hours retention time), the suspended solids varied from 8 to 30 ppm.

As a result of these observations, it is expected that the data collected from plants in the Quarries and Sand & Gravel categories with settling ponds would be sufficient to meet the MISA objectives and ultimately reduce the economic cost of monitoring to the industry. This measure is also expected to provide some incentive to the plants to make use of settling ponds for effluent treatment.

iii. PARAMETERS FOR MONTHLY MONITORING

The parameters selected for monthly monitoring were assigned on a category-specific basis. They include those parameters that were detected in the category during pre-regulation monitoring.

Ammonia plus Ammonium (Total ammonia as Nitrogen)

- measure of both ionized and un-ionized ammonia in effluents;
- ammonia is toxic to fish at levels above 0.02 mg/L (un-ionized);
- the concentration of ammonia in its un-ionized state varies with pH and temperature;
- MOE recommends 0.5 mg/L NH_3 (total as nitrogen) as the upper limit for raw water supplies and 0.02 mg/L of un-ionized NH_3 for the protection of aquatic life.

Oxidized Nitrogen (Total Nitrates + Nitrates, as nitrogen)

- measures total oxidized nitrogen (nitrate + nitrite);
- Ministry drinking water objectives limit $NO_3 + NO_2$ to 10 mg/L as nitrogen;
- levels of NO_3 above 10 mg/L in drinking water can impact haemoglobin in children leading to infantile methemoglobinemia.

Heavy Metals Plus Arsenic

- uptake can occur in plants and animals;
- toxicity effects can be seen at low concentrations in soft waters;
- can exhibit toxicity to humans;
- sublethal effects have been documented.

Phenolics (4AAP)

- the 4-amino antipyrine (4AAP) method measures total phenolics;
- tend to be ubiquitous contaminants and are thus good indicators of pollution severity;
- can be general indicators of treatment;
- can taint fish flesh at levels as low as 1 ug/L.

iv. PARAMETERS FOR MONTHLY MONITORING - STORM WATER

The parameters selected for storm water monitoring were assigned on a category-specific basis. They include the complete list of parameters which were assigned for routine monitoring (thrice weekly or weekly, and monthly) for that category. The routine monitoring list covers all parameters which were detected from the effluent streams in that category and should therefore, cover any potential compounds that may contaminate storm water run-off.

For the IM sector, the monitoring of storm water applies only to those sites with a separate collection system for storm water. In most cases storm water will be included in one of the other effluent stream classifications for the site as was discussed in section ten, under "Classification of Effluents".

The purpose of monitoring these streams is to provide an estimate of the impact on receiving water from storm water effluent loadings in relation to plant discharges to determine whether more intensive monitoring or corrective action may be required in the future.

For those plants that have a storm water collection system, storm water will be monitored at time of discharge and at a frequency of at least once per month provided there is adequate flow of storm water effluent for collection of a sample. No "make up" sample is required for periods of no run-off, with the exception of storm water in the Clay and Shale category.

The Clay and Shale category must collect a compensating set of samples during a subsequent storm water flow period. In order to limit the number of samples required to be collected in single month, a maximum of two samples has been designated for any one month period.

The list of parameters to be monitored has been set out in the category-specific schedules.

XIV CHARACTERIZATION

Characterization is the quantitative determination of individual organic and inorganic parameters from the sector list (Schedule B) which is a subset of EMPPL. Characterization will provide information on the presence or absence of a number of contaminants in the regulated effluents.

To accommodate differences among sector plants and achieve the goal of characterization with some consideration of costs, the sector was divided into two groups for characterization frequencies.

Group 1:	Quarries, Sand and Gravel categories
Group 2:	Cement, Chemical Lime, Clay and Shale, Graphite, Gypsum, Magnesium and Talc categories.

The groupings were based on raw materials, products manufactured and environmental history of the categories.

In addition, the frequency of characterization is a function of the total number of plants in the two groups.

Group 1 plants are required to perform one characterization during the life of the Monitoring Regulation. Group 2 plants are required perform semi-annual characterization.

The costs related to characterization were reduced without sacrificing the integrity of the technical data due to the following reasons:

- sector plants were divided into nine categories based on demonstrated similarities, therefore enabling a generic approach to monitoring;
- some categories consist of a large number of plants from which a significant amount of data will be generated;
- as a result of similarities between plants in each category, the data points collected from each category can be shared for statistical interpretation; and,
- no significant contaminants were detected in the characterizations conducted by industry and MOE in pre-regulation monitoring.

Because of the costs associated with the analyses of PCBs and dioxins, some modifications to the requirements have been made. As there is no reason to suspect dioxins in effluents, only one analysis per plant will be required during the life of this Regulation. Plants that have already carried out dioxin analysis under pre-regulation monitoring do not need to repeat this analysis. However, at plants that incinerate garbage or solvents in kilns, dioxin analysis should be done semi-annually.

PCB analysis is required only by those plants that use PCBs in electrical equipment or store PCBs and plants that incinerate garbage or solvents. PCBs are to be analyzed annually at those plants that use or store PCBs in Group 1. Group 2 plants that use or store PCBs will analyze for PCBs semi-annually. At plants where kilns are used for incineration of garbage or solvents, PCBs are to be analyzed semi-annually.

XV OPEN CHARACTERIZATION

The characterization requirements in the regulation are augmented by requiring open characterization of effluents at the same frequencies as the characterizations.

Open characterization is the identification of contaminants which are not on the Sector list. Gas chromatography/mass spectrometry is used to identify organic contaminants, and ICP (inductively coupled plasma) emission spectroscopy methods are used to identify inorganic contaminants.

Additional contaminants which are identified in open characterizations will be subject to a hazard assessment for possible future addition to the EMPPL list.

The open characterizations for volatiles and extractables (ATG 28a & 28b) conducted during the pre-regulation monitoring program revealed no additional compounds present at 10ppb. Analytical Test Group 29 outlines the parameters that constitute an open characterization for elements. As this sector is inorganic in nature, some elements were detected during pre-regulation monitoring program. Required limits for quantification for elemental scan are 50 ppb.

Two Ministry publications entitled "Guidance Document For The Elemental Characterization of Liquid Waste Samples" (9) and "Techniques For The Gas Chromatography-Mass Spectrometry Identification of Organic Compounds In Effluents" (10) describe in detail the protocols and procedures for performing open characterizations.

XVI TOXICITY TESTING

Toxicity testing requirements for the IM Sector consist of both the fish toxicity test (Rainbow Trout Acute Lethality Test) and the Daphnia magna Acute Lethality Test as outlined in the published protocols entitled:

- "Protocol to Determine the Acute Lethality of Liquid Effluents to Fish" (11)
- "Daphnia magna Acute Lethality Toxicity Test Protocol" (12).

Since it is essential to protect all forms of aquatic life, it is critical that the impact of various effluents be assessed on as many different types of aquatic organisms as is practical.

The Ministry has reviewed both Daphnia magna and rainbow trout test results on the same samples and concluded that Daphnia magna and trout differ in their sensitivity to some effluents and thus the addition of the Daphnia magna test will provide valuable additional information.

As a result of the lack of toxicity data for the Sector, it was decided to conduct both toxicity tests on final discharges to surface water courses.

Due to differences in sector plants, the sector was divided into two groups for toxicity testing frequencies:

Group 1:	Quarries, Sand & Gravel categories: quarry water effluent, wash water effluent.
Group 2:	Cement, Chemical Lime, Clay & Shale, Graphite, Gypsum, Magnesium and Talc categories.

- cement plant effluent
- lime plant effluent
- graphite plant effluent
- gypsum plant effluent
- magnesium plant effluent
- minewater effluent
- quarry water effluent
- storm water effluent (Clay & Shale only)

For the purposes of biomonitoring, a **toxicity test** refers to both a fish toxicity text (Rainbow Trout Acute Lethality Test or LC50) and a Daphnia magna Acute Lethality Test.

a) Group 1 plants: One **toxicity test** will be conducted during the first two quarters of monitoring.

If the final discharge using the rainbow trout acute lethality test incurs fish mortality of no more than 2 out of 10 fish at each dilution, and non-lethal results are obtained for the Daphnia magna tests, then no further toxicity tests are required.

However, if lethal results are obtained for either the fish toxicity test and/or the Daphnia magna acute lethality test, then **toxicity tests** must be performed on three distinct months within the following six months.

b) Group 2 plants: Two **toxicity tests** will be done during the first two quarters of monitoring.
If the final discharge using the rainbow trout acute lethality test incurs fish mortality of no more than 2 out of 10 fish at each dilution, and non-lethal results are obtained for the Daphnia magna tests, then no further toxicity tests are required.

However, if lethal results are obtained for either the fish toxicity test and/or the Daphnia magna acute lethality test, then **toxicity tests** must be performed on a monthly basis for the following six months.

These frequencies are assigned based on the assumption that effluents from this sector are suspected to be non-lethal.

Sector effluents are not true industrial contaminated wastewater like the other MISA industrial sectors. Some quarries and sand and gravel pits use their ponds for fish farming. These monitoring requirements, which will generate over 150 data points with two species, will be adequate to provide conclusive evidence of effluent lethality or non-lethality.

pH adjustment will not be allowed on samples collected for the IM Regulation for the following reasons:

- the Ministry needs to establish the actual toxicity level of the final discharges in the form of LC50 values to assist in future toxicity limit settling. The LC50 limits to be set will be based on those limits achievable using BATEA. The toxicity data will assist in defining the limit;

- adjustment of pH may have an impact on modifying the toxicity of other compounds in the sample.

Final discharges with pH outside the Ministry guidelines of 6.5 to 9.5 will be tested using both the rainbow trout and the Daphnia magna toxicity tests without pH adjustment. It is acknowledged however, that ammonia is present in many effluents and ammonia toxicity is enhanced at high pH.

Therefore, companies may, on a voluntary basis, where the pH is outside the range of the Ministry guidelines, perform toxicity tests on pH adjusted effluents in parallel with those on unadjusted effluents. Submission of data on pH adjusted samples will be voluntary and will be used by the Ministry for comparison with the pH unadjusted sample results. It would also be advisable to supplement pH adjusted results with analyses of ammonia levels.

XVII TYPE OF SAMPLES REQUIRED

The feedstock to all plants in the IM Sector comprises naturally occurring non-acid producing minerals. Since the feedstocks are constant, the effluent contaminants are also expected to be relatively constant, although the concentrations may fluctuate due to the variation in activity within the mine.

Composite or grab-composite samples are most useful for observing average concentrations that will be used in the MISA program for calculating loadings or the efficiency of wastewater treatment facilities. Due to economic considerations, grab-composite samples are permitted instead of composite samples. A grab-composite sample comprises three individual grabs which are combined and taken at intervals of at least two hours. Grab-composite sampling is required for all effluent streams with the following exceptions;

(a) Quarries and Sand & Gravel categories (with settling ponds),

The only relatively stable effluents found were quarry water and wash water at sites with settling ponds. For these sites, grab samples taken on a rotational basis (i.e. at different times during an operating day) are permitted provided that the effluent, prior to sampling, has been retained for at least the 24 hr minimum calculated retention time.

(b) Storm Water.

Grab samples are permitted for all types of storm water effluents.

Grab samples are permitted only for samples that are taken on a thrice weekly, weekly and monthly basis only. Composite or grab-composite samples are required for all samples taken for characterization and open characterization.

XVIII FLOW MEASUREMENT

Effluent guidelines for the Ontario Mineral Industry, in general, have traditionally been based on concentration. Presently, the emphasis is on loadings therefore, flow measurements are required.

Since there are no process effluents in the IM Sector, the requirement of continuous flow measurement with an accuracy of plus or minus 7% as applicable to most of the other sectors, will not apply to the IM sector effluents.

Each direct discharger is required to measure or estimate the flow of each effluent stream at the time of sampling and at a location or set of locations representative of the flow at the sampling point. Methods, devices or calculations for the measurement or estimation of flow must be capable of accuracy to within plus or minus 20 per cent of the actual flow.

Since most effluents from this sector are discharged on a batch-type basis, an estimate of the rate of flow does not provide enough information for the calculation of loadings. The duration and approximate volume of each batch discharge must be reported on a daily basis.

XIX QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control (QA/QC) encompasses all of the procedures undertaken to ensure that data produced are generated within known probability limits of accuracy and precision.

Quality assurance is the overall verification program which provides producers and users of data the assurance that predefined standards of quality at predetermined levels of confidence are met. Quality assurance consists of two elements: quality control and quality assessment.

Quality control is the overall system of guidelines, procedures and practices which are designed to regulate and control the quality of products or services with regard to previously established performance criteria and standards.

Quality assessment is the overall system of activities which ensure that quality control is being performed effectively. This is carried out immediately following quality control and involves evaluation and auditing of quality control data to ensure the success of the quality control program.

QA/QC is one of the most important aspects of the MISA monitoring regulations. The QA/QC program includes many small but essential activities ranging from proving the cleanliness of sample bottles, using proper sampling equipment, containers and preservatives to instrument calibration; validation of authenticity of standards, inclusion of blanks, spikes and controls in analytical runs to documenting performance; participation in external round-robins to defining the proper method for reporting a final number.

XX ECONOMIC IMPLICATIONS OF THE REGULATION

Detailed estimates of the capital costs and operating and maintenance (O&M) costs associated with the six primary monitoring functions and their financial implications, are presented in a report entitled "Monitoring Costs and Their Implications for Direct Dischargers in the Ontario Mineral Industry: Group B - Industrial Minerals Sector". An October 1989 draft of this report, issued by the Policy and Planning Branch of the Ministry of the Environment and subsequently referred to as " Monitoring Costs" report, is available for public review.

The following table provides a breakdown of capital and operating and maintenance costs for each of the nine industry categories in the sector.

SUMMARY OF ESTIMATED CAPITAL AND O&M COSTS
BY INDUSTRY CATEGORY (IN $1,000's)

INDUSTRY CATEGORY	CAPITAL COSTS	O&M COSTS	TOTAL COSTS ($)	TOTAL COSTS (%)
Cement	41.0	389.8	430.8	21.6
Chemical Lime	46.0	317.3	363.3	18.2
Clay & Shale	25.0	68.8	93.8	4.7
Graphite	14.0	122.0	136.0	6.8
Gypsum	20.0	178.5	198.5	10.0
Magnesium	7.0	46.0	53.0	2.7
Quarries	141.5	355.1	496.6	24.9
Sand & Gravel	30.0	90.2	120.2	6.0
Talc	12.0	87.8	99.8	5.0
TOTALS:	336.5	1,655.6	1,992.1	100.0

The largest shares of total costs are expected to be borne by the Quarries category (25%), followed by the Cement (22%) and Chemical Lime (18%) categories. However, the average cost per plant for the Quarries category, at about $5,300, will be the lowest among the nine categories. The Clay and Shale category, at $18,000 per plant, and the Sand and Gravel category, at $20,000, will face the next lowest average costs. Less frequent monitoring is required for the effluent streams in these three categories compared to the other categories. The highest average costs will be faced by cement plants, at about $72,000 per plant, followed by graphite plants ($68,000) and gypsum plants ($66,000). More of the plants in these categories will have to monitor two effluent streams, while most plants in the lower cost categories have only one effluent stream to monitor.

Chemical analyses account for over 40% of the anticipated $2.0 million in total costs to the sector, while sampling costs account for 33%. The computers required for the management of monitoring data represent the major anticipated capital expense in this sector, and are reflected in the 20% of total costs attributed to Reporting requirements. The actual costs may vary from the estimated costs because of uncertainties and contingencies. Therefore, the "Monitoring Costs" report presents the likely ranges of costs for each plant.

The monitoring requirements for the Quarries category are aimed at reducing the likelihood that companies will face financial hardship without reducing the information gathered about the effluents in the category. A representative sampling of 20 quarries has been selected for monitoring. Monitoring costs are to be shared by all 94 quarries which are subject to the regulation. The selection criteria used were: geology, size of the operation, geographical distribution, and wastewater quality. This approach accounts for the observation noted above that costs per plant are substantially lower for the quarries than for the other industry categories. If all 94 quarries were subject to the same monitoring requirements as for the 20 sites that have been selected for representation, total incremental costs would increase by about $1.4 million, and the average cost per quarry would amount to approximately $20,000.

The financial impacts of the estimated costs of monitoring are discussed in the "Monitoring Costs" report. Although some large public firms are represented in the Industrial Minerals Sector, the majority of the firms, particularly among the Quarries and the Sand and Gravel categories, are small and privately held. As a result, the analysis of the likely impacts of the incremental costs of monitoring is somewhat restricted. However, based on communications with representatives of industry groups and firms in this sector, there has been no indication that the financial capabilities of the firms involved will be significantly burdened by the Monitoring Regulation.

XXI REFERENCES

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(6) U.S. Environment Protection Agency "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Cement Manufacturing Point Source Category", January 1974.

(7) Ontario Ministry of the Environment, "The Effluent Monitoring Priority Pollutants List (1987).

(8) Ontario Ministry of the Environment, " The Effluent Monitoring Priority Pollutants List - 1988 Update", March 1989

(9) Ontario Ministry of the Environment, "Guidance Document for the Elemental Characterization of Liquid Waste Samples", November 1988.

(10) Ontario Ministry of the Environment, "Techniques for the Gas Chromatography-Mass Spectrometry Identification of Organic Compounds in Effluents", November 1988

(11) Ontario Ministry of the Environment, "Protocol to Determine the Acute Lethality of Liquid Effluents to Fish", July 1988.

(12) Ontario Ministry of the Environment, "Daphnia Magna Acute Lethality Toxicity Test", April 1988.

APPENDIX I - TABLES

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Cement		Chemical Lime	Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Quarry Water	Cement Plant Water	Lime Plant Water	Storm Water	Minewater	Gypsum Plant Water
ANALYTICAL TEST GROUP		PARAMETERS						
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	X	X	X	X	X	X
2	Cyanide	Cyanide			X	X		
3	Hydrogen ion (pH)	Hydrogen ion (pH)	X	X	X	X	X	X
4a	Nitrogen	Ammonia plus Ammonium						
		Total Kjeldahl nitrogen						
4b		Nitrate + Nitrite	X		X	X	X	X
5a	Organic carbon	Dissolved organic carbon (DOC)	X	X	X	X	X	X
5b		Total organic carbon (TOC)	X	X	X	X	X	X
6	Total phosphorus	Total phosphorus		X	X	X		X
7	Specific conductance	Specific conductance	X	X	X	X	X	X
8	Suspended solids	Total suspended solids (TSS)	X	X	X	X	X	X
		Volatile suspended solids (VSS)	X	X	X	X	X	X
9	Total metals	Aluminum	X	X	X	X	X	X
		Beryllium						
		Cadmium	X		X	X		
		Chromium						
		Cobalt						
		Copper			X			
		Lead						
		Molybdenum			X	X		
		Nickel						
		Silver						
		Thallium						
		Vanadium						
		Zinc			X	X		X
10	Hydrides	Antimony						
		Arsenic						
		Selenium			X			

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Cement		Chemical Lime	Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Quarry Water	Cement Plant Water	Lime Plant Water	Storm Water	Minewater	Gypsum Plant Water
ANALYTICAL TEST GROUP		PARAMETERS						
14	Phenolics (4AAP)	Phenolics (4AAP)			X	X	X	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane						
		1,1,2-Trichloroethane						
		1,1-Dichloroethane						
		1,1-Dichloroethylene						
		1,2-Dichlorobenzene						
		1,2-Dichloroethane (Ethylene dichloride)						
		1,2-Dichloropropane						
		1,3-Dichlorobenzene						
		1,4-Dichlorobenzene						
		Bromoform						
		Bromomethane						
		Carbon tetrachloride						
		Chlorobenzene						
		Chloroform						
		Chloromethane						
		Cis-1,3-Dichloropropylene						
		Dibromochloromethane						
		Ethylene dibromide						
		Methylene chloride						
		Tetrachloroethylene (Perchloroethylene)						
		Trans-1,2-Dichloroethylene						
		Trans-1,3-Dichloropropylene						
		Trichloroethylene						
		Trichlorofluoromethane						
		Vinyl chloride (Chloroethylene)						
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol						
		2,3,4,6-Tetrachlorophenol						
		2,3,5,6-Tetrachlorophenol						
		2,3,4-Trichlorophenol						
		2,3,5-Trichlorophenol						
		2,4,5-Trichlorophenol						
		2,4,6-Trichlorophenol						
		2,4-Dimethyl phenol			X *			
		2,4-Dinitrophenol						
		2,4-Dichlorophenol						

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Cement		Chemical Lime	Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Quarry Water	Cement Plant Water	Lime Plant Water	Storm Water	Minewater	Gypsum Plant Water
ANALYTICAL TEST GROUP		PARAMETERS						
20	Extractables, Acid (Phenolics)	2,6-Dichlorophenol						
		4,6-Dinitro-o-cresol						
		2-Chlorophenol						
		4-Chloro-3-methylphenol						
		4-Nitrophenol						
		m-Cresol			X *			
		o-Cresol			X *			
		p-Cresol						
		Pentachlorophenol						
		Phenol			X *			
25	Solvent Extractables	Oil and grease	X	X	X	X		
29	Open Characterization - Elemental	Aluminum						
		Antimony						
		Arsenic						
		Barium	X	X	X	X		
		Beryllium						
		Bismuth						
		Boron	X	X	X	X	X	X
		Cadmium						
		Calcium	X	X	X	X	X	X
		Cerium					X	X
		Cesium						
		Chromium						
		Cobalt						
		Copper						
		Dysprosium						
		Erbium						
		Europium						
		Gadolinium						
		Gallium						
		Germanium						
		Gold						
		Hafnium						
		Holmium						
		Indium						
		Iridium						
		Iron	X	X	X	X	X	X

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Cement		Chemical Lime	Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Quarry Water	Cement Plant Water	Lime Plant Water	Storm Water	Minewater	Gypsum Plant Water
ANALYTICAL TEST GROUP		PARAMETERS						
29	Open Characterization - Elemental (continued)	Lanthanum					X	X
		Lead						
		Lithium				X	X	X
		Lutetium						
		Magnesium	X	X	X	X	X	X
		Manganese		X		X		X
		Mercury						
		Molybdenum						
		Neodymium						
		Nickel						
		Niobium						
		Osmium						
		Palladium						
		Phosphorus						
		Platinum						
		Potassium	X	X	X	X	X	X
		Praesodymium						
		Rhenium						
		Rhodium						
		Rubidium						
		Ruthenium						
		Samarium						
		Scandium						
		Selenium						
		Silicon	X	X	X	X	X	X
		Silver						
		Sodium	X	X	X	X	X	X
		Strontium	X	X	X	X	X	X
		Sulfur	X	X	X	X	X	X
		Tantalum						
		Tellurium						
		Terbium						
		Thallium						
		Thorium						
		Thulium				X		
		Tin						
		Titanium						
		Tungsten						
		Uranium						

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Cement		Chemical Lime	Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Quarry Water	Cement Plant Water	Lime Plant Water	Storm Water	Minewater	Gypsum Plant Water
ANALYTICAL TEST GROUP		PARAMETERS						
29	Open Characterization - Elemental (continued)	Vanadium						
		Ytterbium						
		Yttrium						
		Zinc						
		Zirconium						

* Found at one plant only (Reiss Lime)

** Found at one plant only (3M Quarry)

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Minewater
ANALYTICAL TEST GROUP		PARAMETERS				
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)		X	X	X
2	Cyanide	Cyanide	X	X	X	X
3	Hydrogen ion (pH)	Hydrogen ion (pH)	X	X	X	X
4a	Nitrogen	Ammonia plus Ammonium				
		Total Kjeldahl nitrogen				
4b		Nitrate + Nitrite	X	X	X	X
5a	Organic carbon	Dissolved organic carbon (DOC)	X	X	X	X
5b		Total organic carbon (TOC)	X	X	X	X
6	Total phosphorus	Total phosphorus				
7	Specific conductance	Specific conductance	X	X	X	X
8	Suspended solids	Total suspended solids (TSS)	X	X	X	X
		Volatile suspended solids (VSS)		X	X	X
9	Total metals	Aluminum	X	X	X	X
		Beryllium				
		Cadmium		X		X
		Chromium				
		Cobalt				
		Copper				
		Lead				
		Molybdenum		X		
		Nickel				
		Silver				
		Thallium				
		Vanadium				
		Zinc		X	X	
10	Hydrides	Antimony				
		Arsenic				X
		Selenium				

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Minewater
ANALYTICAL TEST GROUP		PARAMETERS				
14	Phenolics (4AAP)	Phenolics (4AAP)		X	X	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				
		1,1,2-Trichloroethane				
		1,1-Dichloroethane				
		1,1-Dichloroethylene				
		1,2-Dichlorobenzene				
		1,2-Dichloroethane (Ethylene dichloride)				
		1,2-Dichloropropane				
		1,3-Dichlorobenzene				
		1,4-Dichlorobenzene				
		Bromoform				
		Bromomethane				
		Carbon tetrachloride				
		Chlorobenzene				
		Chloroform				
		Chloromethane				
		Cis-1,3-Dichloropropylene				
		Dibromochloromethane				
		Ethylene dibromide				
		Methylene chloride				
		Tetrachloroethylene (Perchloroethylene)				
		Trans-1,2-Dichloroethylene				
		Trans-1,3-Dichloropropylene				
		Trichloroethylene	X • •			
		Trichlorofluoromethane				
		Vinyl chloride (Chloroethylene)				
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol				
		2,3,4,6-Tetrachlorophenol				
		2,3,5,6-Tetrachlorophenol				
		2,3,4-Trichlorophenol				
		2,3,5-Trichlorophenol				
		2,4,5-Trichlorophenol				
		2,4,6-Trichlorophenol				
		2,4-Dimethyl phenol				
		2,4-Dinitrophenol				
		2,4-Dichlorophenol				

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Minewater
ANALYTICAL TEST GROUP		PARAMETERS				
20	Extractables, Acid (Phenolics)	2,6-Dichlorophenol				
		4,6-Dinitro-o-cresol				
		2-Chlorophenol				
		4-Chloro-3-methylphenol				
		4-Nitrophenol				
		m-Cresol				
		o-Cresol				
		p-Cresol				
		Pentachlorophenol				
		Phenol				
25	Solvent Extractables	Oil and grease	X	X	X	
29	Open Characterization - Elemental	Aluminum				
		Antimony				
		Arsenic				
		Barium	X	X	X	X
		Beryllium				
		Bismuth				
		Boron	X	X	X	X
		Cadmium				
		Calcium	X	X	X	X
		Cerium				
		Cesium				
		Chromium				
		Cobalt				
		Copper				
		Dysprosium				
		Erbium				
		Europium				
		Gadolinium				
		Gallium				
		Germanium				
		Gold				
		Hafnium				
		Holmium				
		Indium				
		Iridium				
		Iron	X	X	X	

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Minewater
ANALYTICAL TEST GROUP		PARAMETERS				
29	Open Characterization - Elemental (continued)	Lanthanum				
		Lead				
		Lithium	X	X		
		Lutetium				
		Magnesium	X	X	X	X
		Manganese	X	X		
		Mercury				
		Molybdenum				
		Neodymium				
		Nickel				
		Niobium				
		Osmium				
		Palladium				
		Phosphorus				
		Platinum				
		Potassium	X	X	X	X
		Praesodymium				
		Rhenium				
		Rhodium				
		Rubidium				
		Ruthenium				
		Samarium				
		Scandium				
		Selenium				
		Silicon	X	X	X	X
		Silver				
		Sodium	X	X	X	X
		Strontium	X	X	X	X
		Sulfur	X	X	X	X
		Tantalum				
		Tellurium				
		Terbium				
		Thallium				
		Thorium				
		Thulium				
		Tin				
		Titanium				
		Tungsten				
		Uranium				

TABLE 1 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED THE MOE MDL

		NAME OF CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Minewater
ANALYTICAL TEST GROUP		PARAMETERS				
29	Open Characterization - Elemental (continued)	Vanadium				
		Ytterbium				
		Yttrium				
		Zinc				
		Zirconium				

* Found at one plant only (Reiss Lime)

** Found at one plant only (3M Quarry)

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Cement			Chemical Lime		Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Intake	Quarry Water	Cement Plant	Intake	Lime Plant	Storm Water	Mine-water	Gypsum Plant
ANALYTICAL TEST GROUP		PARAMETERS								
1	Chemical Oxygen Demand	Chemical Oxygen Demand (COD)	1 / 1	2 / 2	2 / 2	2 / 2	3 / 6	4 / 6	1 / 4	2 / 4
2	Cyanide	Cyanide	1 / 1	1 / 2	0 / 2	1 / 2	2 / 6	3 / 6	0 / 4	0 / 4
3	Hydrogen ion (pH)	Hydrogen ion (pH)	8	8	8	8	8 - 11	8	8	8
4a	Nitrogen	Ammonia plus Ammonium	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total Kjeldahl nitrogen	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
4b		Nitrate + Nitrite	0 / 1	1 / 2	0 / 2	2 / 2	6 / 6	4 / 6	2 / 4	3 / 4
5a	Organic Carbon	Dissolved organic carbon (DOC)	1 / 1	2 / 2	2 / 2	2 / 2	5 / 6	6 / 6	3 / 4	2 / 4
5b		Total organic carbon (TOC)	2 / 2	2 / 2	1 / 2	2 / 2	3 / 6	2 / 6	2 / 4	2 / 4
6	Total phosphorus	Total phosphorus	0 / 1	0 / 2	1 / 2	1 / 2	1 / 6	1 / 6	0 / 4	1 / 4
7	Specific conductance	Specific conductance	1 / 1	2 / 2	2 / 2	2 / 2	6 / 6	6 / 6	4 / 4	4 / 4
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	1 / 1	2 / 2	2 / 2	2 / 2	6 / 6	6 / 6	4 / 4	4 / 4
		Volatile suspended solids (VSS)	0 / 1	1 / 2	2 / 2	1 / 2	2 / 6	1 / 6	3 / 4	2 / 4
9	Total metals	Aluminum	1 / 1	2 / 2	2 / 2	2 / 2	6 / 6	6 / 6	4 / 4	4 / 4
		Beryllium	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Cadmium	1 / 1	2 / 2	1 / 2	0 / 2	1 / 6	2 / 6	0 / 4	0 / 4
		Chromium	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Cobalt	1 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Copper	0 / 1	0 / 2	0 / 2	2 / 2	2 / 6	0 / 6	0 / 4	0 / 4
		Lead	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Molybdenum	0 / 1	0 / 2	0 / 2	0 / 2	1 / 6	4 / 6	0 / 4	0 / 4
		Nickel	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Silver	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Thallium	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Vanadium	0 / 1	0 / 2	0 / 2	0 / 2	1 / 6	0 / 6	0 / 4	0 / 4
		Zinc	0 / 1	0 / 2	0 / 2	0 / 2	1 / 6	6 / 6	1 / 4	3 / 4

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Cement			Chemical Lime		Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Intake	Quarry Water	Cement Plant	Intake	Lime Plant	Storm Water	Mine-water	Gypsum Plant
ANALYTICAL TEST GROUP		PARAMETERS								
10	Hydrides	Antimony	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Arsenic	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Selenium	0 / 1	0 / 2	0 / 2	0 / 2	1 / 6	0 / 6	0 / 4	0 / 4
12	Mercury	Mercury	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
14	Phenolics (4AAP)	Phenolics (4AAP)	0 / 1	0 / 2	0 / 2	1 / 2	4 / 6	0 / 6	1 / 4	0 / 4
15	Sulphide	Sulphide	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,1,2-Trichloroethane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,1-Dichloroethane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,1-Dichloroethylene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,2-Dichlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,2-Dichloroethane (Ethylene dichloride)	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,2-Dichloropropane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,3-Dichlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,4-Dichlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Bromoform	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Bromomethane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Carbon tetrachloride	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Chlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Chloroform	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Chloromethane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Cis-1,3-Dichloropropylene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Dibromochloromethane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Ethylene dibromide	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Methylene chloride	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Tetrachloroethylene (Perchloroethylene)	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Trans-1,2-Dichloroethylene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Trans-1,3-Dichloropropylene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Trichloroethylene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Trichlorofluoromethane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Vinyl chloride (Chloroethylene)	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Cement			Chemical Lime		Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Intake	Quarry Water	Cement Plant	Intake	Lime Plant	Storm Water	Mine-water	Gypsum Plant
ANALYTICAL TEST GROUP		PARAMETERS								
17	Volatiles, Non-Halogenated	Benzene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Styrene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Toluene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		o-Xylene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		m-Xylene and p-Xylene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
18	Volatiles, Water Soluble	Acrolein	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Acrylonitrile	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
19	Extractables, Base Neutral	Acenaphthene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		5-nitro Acenaphthene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Acenaphthylene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Anthracene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Benz(a)anthracene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Benzo(a)pyrene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Benzo(b)fluoranthene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Benzo(g,h,i)perylene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Benzo(k)fluoranthene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Biphenyl	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Camphene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		1-Chloronaphthalene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		2-Chloronaphthalene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Chrysene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Dibenz(a,h)anthracene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Fluoranthene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Fluorene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Indeno(1,2,3-cd)pyrene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Indole	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		1-Methylnaphthalene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		2-Methylnaphthalene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Naphthalene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Perylene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Phenanthrene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Pyrene	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Benzyl butyl phthalate	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Bis(2-ethylhexyl) phthalate	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		Di-n-butyl phthalate	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4
		4-Bromophenyl phenyl ether	0/1	0/2	0/2	0/2	0/6	0/6	0/4	0/4

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Cement			Chemical Lime		Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Intake	Quarry Water	Cement Plant	Intake	Lime Plant	Storm Water	Mine-water	Gypsum Plant
ANALYTICAL TEST GROUP		PARAMETERS								
19	Extractables, Base Neutral (continued)	4-Chlorophenyl phenyl ether	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Bis(2-chloroisopropyl)ether	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Bis(2-chloroethyl)ether	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Diphenyl ether	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,4-Dinitrotoluene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,6-Dinitrotoluene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Bis(2-chloroethoxy)methane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Diphenylamine	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		N-Nitrosodiphenylamine	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		N-Nitrosodi-n-propylamine	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,3,4,6-Tetrachlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,3,5,6-Tetrachlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,3,4-Trichlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,3,5-Trichlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,4,5-Trichlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,4,6-Trichlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,4-Dimethyl phenol	0 / 1	0 / 2	0 / 2	0 / 2	1 / 6	0 / 6	0 / 4	0 / 4
		2,4-Dinitrophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,4-Dichlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,6-Dichlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		4,6-Dinitro-o-cresol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2-Chlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		4-Chloro-3-methylphenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		4-Nitrophenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		m-Cresol	0 / 1	0 / 2	0 / 2	0 / 2	1 / 6	0 / 6	0 / 4	0 / 4
		o-Cresol	0 / 1	0 / 2	0 / 2	0 / 2	1 / 6	0 / 6	0 / 4	0 / 4
		p-Cresol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Pentachlorophenol	0 / 1	0 / 2	0 / 2	0 / 2	1 / 6	0 / 6	0 / 4	0 / 4
		Phenol	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,2,3,5-Tetrachlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,2,4,5-Tetrachlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,2,3-Trichlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		1,2,4-Trichlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		2,4,5-Trichlorotoluene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Cement			Chemical Lime		Clay and Shale	Gypsum	
		EFFLUENT STREAM TYPE:	Intake	Quarry Water	Cement Plant	Intake	Lime Plant	Storm Water	Mine-water	Gypsum Plant
ANALYTICAL TEST GROUP		PARAMETERS								
23	Extractables, Neutral -Chlorinated (continued)	Hexachlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Hexachlorobutadiene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Hexachlorocyclopentadiene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Hexachloroethane	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Octachlorostyrene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Pentachlorobenzene	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Octachlorodibenzo-p-dioxin	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Octachlorodibenzofuran	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total heptachlorinated dibenzo-p-dioxins	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total heptachlorinated dibenzofurans	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total hexachlorinated dibenzo-p-dioxins	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total hexachlorinated dibenzofurans	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total pentachlorinated dibenzo-p-dioxins	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total pentachlorinated dibenzofurans	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total tetrachlorinated dibenzo-p-dioxins	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
		Total tetrachlorinated dibenzofurans	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4
25	Solvent Extractables	Oil and grease	0 / 1	1 / 2	1 / 2	1 / 1	2 / 6	3 / 6	0 / 4	0 / 4
27	Polychlorinated Biphenyls (PCBs) (Total)	PCBs (Total)	0 / 1	0 / 2	0 / 2	0 / 2	0 / 6	0 / 6	0 / 4	0 / 4

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Mine-water
ANALYTICAL TEST GROUP		PARAMETERS				
1	Chemical Oxygen Demand	Chemical Oxygen Demand (COD)	3 / 9	4 / 5	1 / 6	1 / 2
2	Cyanide	Cyanide	2 / 9	0 / 5	3 / 6	2 / 2
3	Hydrogen ion (pH)	Hydrogen ion (pH)	8	8	8	8
4a	Nitrogen	Ammonia plus Ammonium	0 / 9	0 / 5	0 / 6	0 / 2
		Total Kjeldahl nitrogen	0 / 9	0 / 5	0 / 2	0 / 4
4b		Nitrate + Nitrite	7 / 9	1 / 5	2 / 6	1 / 2
5a	Organic Carbon	Dissolved organic carbon (DOC)	9 / 9	5 / 5	6 / 6	2 / 2
5b		Total organic carbon (TOC)	6 / 9	5 / 5	3 / 6	2 / 2
6	Total phosphorus	Total phosphorus	0 / 9	0 / 5	0 / 6	0 / 2
7	Specific conductance	Specific conductance	9 / 9	5 / 5	6 / 6	2 / 2
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	7 / 9	4 / 5	5 / 6	2 / 2
		Volatile suspended solids (VSS)	1 / 9	1 / 5	1 / 6	2 / 2
9	Total metals	Aluminum	9 / 9	5 / 5	6 / 6	2 / 2
		Beryllium	0 / 9	0 / 5	0 / 6	0 / 2
		Cadmium	1 / 9	0 / 5	0 / 6	1 / 2
		Chromium	0 / 9	0 / 5	0 / 6	0 / 2
		Cobalt	0 / 9	0 / 5	0 / 6	0 / 2
		Copper	0 / 9	0 / 5	0 / 6	0 / 2
		Lead	0 / 9	0 / 5	0 / 6	0 / 2
		Molybdenum	1 / 9	0 / 5	0 / 6	0 / 2
		Nickel	0 / 9	0 / 5	0 / 6	0 / 2
		Silver	0 / 9	0 / 5	0 / 6	0 / 2
		Thallium	0 / 9	0 / 5	0 / 6	0 / 2
		Vanadium	0 / 9	0 / 5	0 / 6	0 / 2
		Zinc	3 / 9	0 / 5	2 / 6	0 / 2

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Minewater
ANALYTICAL TEST GROUP		PARAMETERS				
10	Hydrides	Antimony	0/9	0/5	0/6	0/2
		Arsenic	0/9	0/5	0/6	1/2
		Selenium	0/9	0/5	0/6	0/2
12	Mercury	Mercury	0/9	0/5	0/6	0/2
14	Phenolics (4AAP)	Phenolics (4AAP)	1/9	1/5	1/6	0/2
15	Sulphide	Sulphide	0/9	0/5	0/6	0/2
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	0/9	0/5	0/6	0/2
		1,1,2-Trichloroethane	0/9	0/5	0/6	0/2
		1,1-Dichloroethane	0/9	0/5	0/6	0/2
		1,1-Dichloroethylene	0/9	0/5	0/6	0/2
		1,2-Dichlorobenzene	0/9	0/5	0/6	0/2
		1,2-Dichloroethane (Ethylene dichloride)	0/9	0/5	0/6	0/2
		1,2-Dichloropropane	0/9	0/5	0/6	0/2
		1,3-Dichlorobenzene	0/9	0/5	0/6	0/2
		1,4-Dichlorobenzene	0/9	0/5	0/6	0/2
		Bromoform	0/9	0/5	0/6	0/2
		Bromomethane	0/9	0/5	0/6	0/2
		Carbon tetrachloride	0/9	0/5	0/6	0/2
		Chlorobenzene	0/9	0/5	0/6	0/2
		Chloroform	0/9	0/5	0/6	0/2
		Chloromethane	0/9	0/5	0/6	0/2
		Cis-1,3-Dichloropropylene	0/9	0/5	0/6	0/2
		Dibromochloromethane	0/9	0/5	0/6	0/2
		Ethylene dibromide	0/9	0/5	0/6	0/2
		Methylene chloride	0/9	0/5	0/6	0/2
		Tetrachloroethylene (Perchloroethylene)	0/9	0/5	0/6	0/2
		Trans-1,2-Dichloroethylene	0/9	0/5	0/6	0/2
		Trans-1,3-Dichloropropylene	0/9	0/5	0/6	0/2
		Trichloroethylene	1/9	0/5	0/6	0/2
		Trichlorofluoromethane	0/9	0/5	0/6	0/2
		Vinyl chloride (Chloroethylene)	0/9	0/5	0/6	0/2

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Minewater
ANALYTICAL TEST GROUP		PARAMETERS				
17	Volatiles, Non-Halogenated	Benzene	0 / 9	0 / 5	0 / 6	0 / 2
		Styrene	0 / 9	0 / 5	0 / 6	0 / 2
		Toluene	0 / 9	0 / 5	0 / 6	0 / 2
		o-Xylene	0 / 9	0 / 5	0 / 6	0 / 2
		m-Xylene and p-Xylene	0 / 9	0 / 5	0 / 6	0 / 2
18	Volatiles, Water Soluble	Acrolein	0 / 9	0 / 5	0 / 6	0 / 2
		Acrylonitrile	0 / 9	0 / 5	0 / 6	0 / 2
19	Extractables, Base Neutral	Acenaphthene	0 / 9	0 / 5	0 / 6	0 / 2
		5-nitro Acenaphthene	0 / 9	0 / 5	0 / 6	0 / 2
		Acenaphthylene	0 / 9	0 / 5	0 / 6	0 / 2
		Anthracene	0 / 9	0 / 5	0 / 6	0 / 2
		Benz(a)anthracene	0 / 9	0 / 5	0 / 6	0 / 2
		Benzo(a)pyrene	0 / 9	0 / 5	0 / 6	0 / 2
		Benzo(b)fluoranthene	0 / 9	0 / 5	0 / 6	0 / 2
		Benzo(g,h,i)perylene	0 / 9	0 / 5	0 / 6	0 / 2
		Benzo(k)fluoranthene	0 / 9	0 / 5	0 / 6	0 / 2
		Biphenyl	0 / 9	0 / 5	0 / 6	0 / 2
		Camphene	0 / 9	0 / 5	0 / 6	0 / 2
		1-Chloronaphthalene	0 / 9	0 / 5	0 / 6	0 / 2
		2-Chloronaphthalene	0 / 9	0 / 5	0 / 6	0 / 2
		Chrysene	0 / 9	0 / 5	0 / 6	0 / 2
		Dibenz(a,h)anthracene	0 / 9	0 / 5	0 / 6	0 / 2
		Fluoranthene	0 / 9	0 / 5	0 / 6	0 / 2
		Fluorene	0 / 9	0 / 5	0 / 6	0 / 2
		Indeno(1,2,3-cd)pyrene	0 / 9	0 / 5	0 / 6	0 / 2
		Indole	0 / 9	0 / 5	0 / 6	0 / 2
		1-Methylnaphthalene	0 / 9	0 / 5	0 / 6	0 / 2
		2-Methylnaphthalene	0 / 9	0 / 5	0 / 6	0 / 2
		Naphthalene	0 / 9	0 / 5	0 / 6	0 / 2
		Perylene	0 / 9	0 / 5	0 / 6	0 / 2
		Phenanthrene	0 / 9	0 / 5	0 / 6	0 / 2
		Pyrene	0 / 9	0 / 5	0 / 6	0 / 2
		Benzyl butyl phthalate	0 / 9	0 / 5	0 / 6	0 / 2
		Bis(2-ethylhexyl) phthalate	0 / 9	0 / 5	0 / 6	0 / 2
		Di-n-butyl phthalate	0 / 9	0 / 5	0 / 6	0 / 2
		4-Bromophenyl phenyl ether	0 / 9	0 / 5	0 / 6	0 / 2

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Mine-water
ANALYTICAL TEST GROUP		PARAMETERS				
19	Extractables, Base Neutral (continued)	4-Chlorophenyl phenyl ether	0/9	0/5	0/6	0/2
		Bis(2-chloroisopropyl)ether	0/9	0/5	0/6	0/2
		Bis(2-chloroethyl)ether	0/9	0/5	0/6	0/2
		Diphenyl ether	0/9	0/5	0/6	0/2
		2,4-Dinitrotoluene	0/9	0/5	0/6	0/2
		2,6-Dinitrotoluene	0/9	0/5	0/6	0/2
		Bis(2-chloroethoxy)methane	0/9	0/5	0/6	0/2
		Diphenylamine	0/9	0/5	0/6	0/2
		N-Nitrosodiphenylamine	0/9	0/5	0/6	0/2
		N-Nitrosodi-n-propylamine	0/9	0/5	0/6	0/2
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	0/9	0/5	0/6	0/2
		2,3,4,6-Tetrachlorophenol	0/9	0/5	0/6	0/2
		2,3,5,6-Tetrachlorophenol	0/9	0/5	0/6	0/2
		2,3,4-Trichlorophenol	0/9	0/5	0/6	0/2
		2,3,5-Trichlorophenol	0/9	0/5	0/6	0/2
		2,4,5-Trichlorophenol	0/9	0/5	0/6	0/2
		2,4,6-Trichlorophenol	0/9	0/5	0/6	0/2
		2,4-Dimethyl phenol	0/9	0/5	0/6	0/2
		2,4-Dinitrophenol	0/9	0/5	0/6	0/2
		2,4-Dichlorophenol	0/9	0/5	0/6	0/2
		2,6-Dichlorophenol	0/9	0/5	0/6	0/2
		4,6-Dinitro-o-cresol	0/9	0/5	0/6	0/2
		2-Chlorophenol	0/9	0/5	0/6	0/2
		4-Chloro-3-methylphenol	0/9	0/5	0/6	0/2
		4-Nitrophenol	0/9	0/5	0/6	0/2
		m-Cresol	0/9	0/5	0/6	0/2
		o-Cresol	0/9	0/5	0/6	0/2
		p-Cresol	0/9	0/5	0/6	0/2
		Pentachlorophenol	0/9	0/5	0/6	0/2
		Phenol	0/9	0/5	0/6	0/2
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	0/9	0/5	0/6	0/2
		1,2,3,5-Tetrachlorobenzene	0/9	0/5	0/6	0/2
		1,2,4,5-Tetrachlorobenzene	0/9	0/5	0/6	0/2
		1,2,3-Trichlorobenzene	0/9	0/5	0/6	0/2
		1,2,4-Trichlorobenzene	0/9	0/5	0/6	0/2
		2,4,5-Trichlorotoluene	0/9	0/5	0/6	0/2

TABLE 2 - INDUSTRIAL MINERALS SECTOR PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

		CATEGORY:	Quarries		Sand and Gravel	Talc
		EFFLUENT STREAM TYPE:	Quarry Water	Wash Water	Wash Water	Mine-water
ANALYTICAL TEST GROUP		PARAMETERS				
23	Extractables, Neutral -Chlorinated (continued)	Hexachlorobenzene	0 / 9	0 / 5	0 / 6	0 / 2
		Hexachlorobutadiene	0 / 9	0 / 5	0 / 6	0 / 2
		Hexachlorocyclopentadiene	0 / 9	0 / 5	0 / 6	0 / 2
		Hexachloroethane	0 / 9	0 / 5	0 / 6	0 / 2
		Octachlorostyrene	0 / 9	0 / 5	0 / 6	0 / 2
		Pentachlorobenzene	0 / 9	0 / 5	0 / 6	0 / 2
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0 / 9	0 / 5	0 / 6	0 / 2
		Octachlorodibenzo-p-dioxin	0 / 9	0 / 5	0 / 6	0 / 2
		Octachlorodibenzofuran	0 / 9	0 / 5	0 / 6	0 / 2
		Total heptachlorinated dibenzo-p-dioxins	0 / 9	0 / 5	0 / 6	0 / 2
		Total heptachlorinated dibenzofurans	0 / 9	0 / 5	0 / 6	0 / 2
		Total hexachlorinated dibenzo-p-dioxins	0 / 9	0 / 5	0 / 6	0 / 2
		Total hexachlorinated dibenzofurans	0 / 9	0 / 5	0 / 6	0 / 2
		Total pentachlorinated dibenzo-p-dioxins	0 / 9	0 / 5	0 / 6	0 / 2
		Total pentachlorinated dibenzofurans	0 / 9	0 / 5	0 / 6	0 / 2
		Total tetrachlorinated dibenzo-p-dioxins	0 / 9	0 / 5	0 / 6	0 / 2
		Total tetrachlorinated dibenzofurans	0 / 9	0 / 5	0 / 6	0 / 2
25	Solvent Extractables	Oil and grease	1 / 9	1 / 5	2 / 6	0 / 2
27	Polychlorinated Biphenyls (PCBs) (Total)	PCBs (Total)	0 / 9	0 / 5	0 / 6	0 / 2

TABLE 3 - INDUSTRIAL MINERALS SECTOR - PRE-REGULATION

SUMMARY OF TOTAL SUSPENDED SOLIDS RESULTS

EFFLUENT STREAM TYPE	RANGE OF TSS (mg/L)
Wash Water/Quarry Water (Plants with settling ponds)	<1 - 12
Magnesium Plant	1 - 13
Wash Water/Quarry Water (No settling ponds)	8 - 30
Lime Plant Effluent	5 - 70
Gypsum Plant Effluent	5 - 60
Minewater Effluent	5 - 60
Cement Plant Effluent	30 - 300

TABLE 4 - INDUSTRIAL MINERALS SECTOR - PRE-REGULATION MONITORING

SUMMARY OF HEAVY METALS AND ARSENIC RESULTS* AND PWQOs (Aquatic Life and Drinking Water) in µg/L (PPB)

ELEMENT	CATEGORIES								PWQO	
	Cement	Chemical Lime	Clay and Shale	Gypsum	Magnesium	Quarries	Sand and Gravel	Talc	Aquatic Life	Drinking Water (MAC)
Arsenic	ND	ND	ND	ND	ND	ND	ND	29	100	50
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	11, 1100**	-
Cadmium	5	2	8	ND	ND	2	ND	5	0.2	5.0
Chromium	ND	ND	ND	ND	ND	ND	ND	ND	100	50
Copper	ND	14	ND	ND	ND	ND	ND	ND	5	1000 (MDC)
Iron	1100	150	980	650	ND	54	300	ND	300	300 (MDC)
Lead	ND	ND	ND	ND	ND	ND	ND	ND	5 - 20†	50
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1.0
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	25	-
Selenium	ND	10	ND	ND	ND	ND	ND	ND	100	10
Silver	ND	ND	ND	ND	ND	ND	ND	ND	0.1	50
Zinc	ND	40	100	27	ND	38	34	ND	30	5000 (MDC)

* Maximum concentration detected

ND Not detected

** Hardness less than 75 mg/L (11 µg/L)
Hardness greater than 75 mg/L (1100 µg/L)

† Function of alkalinity

MAC Maximum Acceptable Concentration related to health

MDC Maximum Desirable Concentration related to aesthetic quality

PWQO's are based on total concentration of unfiltered water sample except mercury which is a filtered sample.

INDUSTRIAL MINERALS SECTOR - PRE-REGULATION MONITORING

TABLE 5: SUMMARY OF NITRATE RESULTS

CATEGORY	MAXIMUM DETECTED CONCENTRATION Nitrate as N in mg/L
Cement	8.3 (Quarry Water Effluent)
Chemical Lime	4.8
Clay and Shale	10.0
Gypsum	3.2
Magnesium	3.2
Quarries	4.2
Sand and Gravel	0.6
Talc	2.6

TABLE 6: PRE-REGULATION MONITORING EFFLUENT CHARACTERIZATIONS

CATEGORY	EFFLUENT STREAM TYPE	# OF OPEN CHARACTERIZATIONS		DIOXINS	
		INDUSTRY	MOE	INDUSTRY	MOE
Cement	Intake	1	-	1	-
	Quarry Water	2	-	2	-
	Cement Plant	2	1	2	1
Chemical Lime	Intake	2	-	2	-
	Lime Plant	6	2	6	2
Clay and Shale	Storm Water	6	3	6	3
Gypsum	Minewater	4	1	4	1
	Wash Water	4	1	4	1
Magnesium	Quarry Water	-	1	-	1
	Magnesium Plant	-	1	-	1
	Storm Water	-	1	-	1
Quarries	Quarry Water	9	5	9	5
	Wash Water	5	3	5	3
Sand and Gravel	Wash Water	6	3	6	3
Talc	Minewater	2	1	2	1

TABLE 7 - PROBABILITY OF DETECTING AT LEAST ONE SAMPLE ABOVE THE DETECTION LIMIT

SINGLE SAMPLE PROBABILITY OF		NUMBER OF SAMPLES								RATIO OF DETECT/ (DETECT + NON-DETECT) (D/D+ND)
DETECT (P)	NON-DETECT (Q)	12	11	10	9	8	6	4	2	
0.5	0.5	0.999	0.999	0.999	0.998	0.996	0.984	0.937	0.750	1/2
0.4	0.6	0.998	0.996	0.994	0.990	0.983	0.953	0.870	0.640	2/5
0.3	0.7	0.986	0.980	0.972	0.960	0.942	0.882	0.759	0.510	3/10
0.2	0.8	0.931	0.914	0.893	0.866	0.832	0.738	0.590	0.360	1/5
0.1	0.9	0.717	0.686	0.651	0.613	0.569	0.468	0.344	0.190	1/10
0.05	0.95	0.460	0.431	0.401	0.370	0.337	0.265	0.185	0.098	1/20
0.02	0.98	0.215	0.199	0.183	0.166	0.149	0.114	0.078	0.040	1/50
0.01	0.99	0.113	0.105	0.095	0.086	0.077	0.058	0.039	0.019	1/100

The table shows the probability of a sample with a parameter above MDL for the number of samples tested.

PART C

DRAFT MONITORING REGULATION
FOR THE
INDUSTRIAL MINERALS SECTOR

REGULATION MADE UNDER THE ENVIRONMENTAL PROTECTION ACT

EFFLUENT MONITORING - INDUSTRIAL MINERALS SECTOR

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REGULATION MADE UNDER THE ENVIRONMENTAL PROTECTION ACT

EFFLUENT MONITORING - INDUSTRIAL MINERALS SECTOR

Definitions

1.-(1)In this Regulation,

"annually" means once during the period beginning May 1st, 1990 and ending April 31st, 1991;

"batch discharge" means a discrete discharge from an effluent stream to a surface watercourse;

"cement plant effluent" means effluent from a cement plant;

"cement plant effluent sampling point" means a location in a cement plant effluent stream situated,

(a) before the place of discharge to a surface watercourse;

(b) after any final treatment, and

(c) upstream of any significant contaminant masking or significant dilution from any other effluent stream;

"cement plant effluent stream" means cement plant effluent that flows through an open or closed channel;

"characterization" means the analysis of a sample for all of the parameters specified in Schedule B;

"General Effluent Monitoring Regulation" means Ontario Regulation 695/88;

"grab sample" means a volume of effluent of at least 100 milliliters that is collected over a period not exceeding one hour and immediately transferred to the appropriate laboratory sample container set out in Column 2 to the General Effluent Monitoring Regulation and in Column 2 of Schedule L to this Regulation;

"grab-composite sample" means a volume of effluent made up of three or more grab samples taken over an operating day and combined in equal volume, provided that the time period between consecutive samples is not less than two hours;

"graphite plant effluent" means effluent from a graphite plant;

"graphite plant effluent sampling point" means a location in a graphite plant effluent stream situated,

(a) before the place of discharge to a surface watercourse;

(b) after any final treatment, and

(c) upstream of any significant contaminant masking or significant dilution from any other effluent stream;

"graphite plant effluent stream" means graphite plant effluent that flows through an open or closed channel;

"gypsum plant effluent" means effluent from a gypsum plant;

"gypsum plant effluent sampling point" means a location in a gypsum plant effluent stream situated,

(a) before the place of discharge to a surface watercourse;

(b) after any final treatment, and

(c) upstream of any significant contaminant masking or significant dilution from any other effluent stream;

"gypsum plant effluent stream" means gypsum plant effluent that flows through an open or closed channel;

"Industrial Minerals Sector" means plants listed in Schedule A;

"lime plant effluent" means effluent from a lime plant;

"lime plant effluent sampling point" means a location in a lime plant effluent stream situated,

(a) before the place of discharge to a surface watercourse;

(b) after any final treatment, and

(c) upstream of any significant contaminant masking or significant dilution from any other effluent stream;

"lime plant effluent stream" means lime plant effluent that flows through an open or closed channel;

"magnesium plant effluent" means effluent from a magnesium plant;

"magnesium plant effluent sampling point" means a location in a magnesium plant effluent stream situated,

(a) before the place of discharge to a surface watercourse;

(b) after any final treatment, and

(c) upstream of any significant contaminant masking or significant dilution from any other effluent stream;

"magnesium plant effluent stream" means magnesium plant effluent that flows through an open or closed channel;

"minewater effluent" means effluent from an underground mine;

"minewater effluent sampling point" means a location in a minewater effluent stream situated,

(a) before the place of discharge to a surface watercourse;

(b) after any final treatment, and

(c) upstream of any significant contaminant masking or significant dilution from any other effluent stream;

"minewater effluent stream" means minewater effluent that flows through an open or closed channel;

"quarry water effluent" means effluent from a quarry;

"quarry water effluent sampling point" means a location in a quarry water effluent stream situated,

(a) before the place of discharge to a surface watercourse;

(b) after any final treatment, and

(c) upstream of any significant contaminant masking or significant dilution from any other effluent stream;

"quarry water effluent stream" means quarry water effluent that flows through an open or closed channel;

"semi-annually" means once in each of two periods of six months beginning on the first day of January and on the first day of July;

"settling pond" means a treatment facility capable of holding a volume of effluent under quiescent conditions for a period of time equivalent to the minimum calculated retention time for that volume of effluent;

"wash water effluent" means effluent which results from the washing or processing of sand, gravel or crushed stones;

"wash water effluent sampling point" means a location in a wash water effluent stream situated,

(a) before the place of discharge to a surface watercourse;

(b) after any final treatment, and

(c) upstream of any significant contaminant masking or significant dilution from any other effluent stream;

"wash water effluent stream" means wash water effluent that flows through an open or closed channel;

(2) The definitions in section 1 of the General Effluent Monitoring Regulation that are not redefined in this Regulation apply to this Regulation.

(3) Where a term is defined in this Regulation, and in the General Effluent Monitoring Regulation, the definition in this Regulation applies to the General Effluent Monitoring Regulation insofar as that Regulation governs direct dischargers to whom this Regulation applies.

Purpose

2. The purpose of this Regulation is to establish a database on effluent quality in the Industrial Minerals Sector that will be used, along with other pertinent information, to develop effluent limits for that sector.

Application

3.-(1)This Regulation applies only with respect to the plants listed in Schedule A and only with respect to the effluent streams on which sampling points are established under section 4.

(2) For the purposes of this Regulation, the plants to which this Regulation applies are divided into categories as set out in Schedule A.

(3) The category specific monitoring schedule is as set out in Schedule A.

(4) Sections 3 to 6 and subsections 7(2) to (10) of the General Effluent Monitoring Regulation, and sections 5 to 13 and subsections 14(9) to (24) of this Regulation do not apply in respect of plants shown in Schedule A as non-monitoring sites.

(5) Where a direct discharger whose plant is in the Quarries or Sand & Gravel category, demonstrates to the director by means of certified report by a registered professional engineer of the province of Ontario, that the total final effluent discharge of that direct discharger during a period of peak discharge is less than 50,000 liters per day averaged over thirty consecutive days while the plant is in operation, then that discharger is exempted from all obligations under sections 3 to 7 of the General Effluent Monitoring Regulation and sections 4 to 14 to this Regulation.

(6) A report submitted for the purposes of subsection (5), shall be submitted no later than 30 days before the day on which the first set of samples is required to be collected.

(7) This Regulation is a Sectoral Effluent Monitoring Regulation within the meaning of the General Effluent Monitoring Regulation.

(8) Each direct discharger shall carry out the monitoring obligations, including the sampling, analysis, toxicity testing, flow measurement, recording and reporting obligations of this Regulation, in accordance with the General Effluent Monitoring Regulation and in accordance with Schedules L and M to this Regulation.

(9) An obligation to do a thing under this Regulation is discharged if another person has done it on the direct discharger's behalf.

(10) A direct discharger who for any period of time does not discharge an effluent is exempt, for that period, from the requirements of this Regulation that pertain to that effluent.

(11) When on an operating day a set of samples is collected under sections 7 to 9 from a sampling point at which a collection or analysis was performed on the same day under section 6, the direct discharger need not analyze the set of samples for parameters for which an analysis was performed under section 6.

Sampling Points

4.-(1)Each direct discharger shall, by the day on which a report is required to be submitted by that discharger under subsection 14(1), establish a sampling point on each effluent stream named in the category-specific monitoring schedule for that discharger's plant, as follows:

1. A cement plant effluent sampling point on each cement plant effluent stream;
2. A lime plant effluent sampling point on each lime plant effluent stream;
3. A graphite plant effluent sampling point on each graphite plant effluent stream;
4. A gypsum plant effluent sampling point on each gypsum plant effluent stream;
5. A magnesium plant effluent sampling point on each magnesium plant effluent stream;
6. A minewater effluent sampling point on each minewater water effluent stream;
7. A quarry water effluent sampling point on each quarry water effluent stream;
8. A storm water sampling point on each storm water effluent stream;
9. A wash water effluent sampling point on each wash water effluent stream.

(2) Each direct discharger shall use the sampling points established under subsection (1) for all sampling required by this Regulation, except that a discharger may use alternate sampling points where that is acceptable to the Director.

(3) Each direct discharger shall make every reasonable effort to collect all sets of samples required to be collected from those sampling points established under subsection (1) for that discharger's plant, on the same operating day.

Sampling Principles

5.-(1)In this section, "calculated retention time", in relation to a settling pond means the period of time in days that results from dividing the average daily effluent discharged from that pond, expressed in cubic metres, into the total available volume, expressed in cubic metres, of that settling pond.

(2) For the purpose of calculating a calculated retention time, each direct discharger shall obtain the average daily effluent discharge by averaging the total volumetric discharge of effluent, as estimated in accordance with flow measurement principles as set out under section 5, in cubic metres, over a period of thirty consecutive operating days.

(3) For the purpose of subsection (6), a calculated retention time must be calculated no later that 30 days before sections 6 to 13 come into force.

(4) Subject to subsections (6) and (9), each direct discharger shall collect each sample required to be collected from a sampling point established under subsection 4(1),

(a) as a composite sample by one of the means described in subsection 3(4) of the General Effluent Monitoring Regulation; or

(b) as a grab-composite sample in accordance with subsection (5) to this Regulation.

(5) Each grab-composite sample shall be collected by taking three equal volume grab samples at intervals of at least two hours over an operating day and combining them manually.

(6) Subject to subsection (7), a direct discharger whose plant is in the Quarries or Sand and Gravel category may collect each sample as a single grab sample provided the effluent is held in a settling pond for a minimum calculated retention time of 24 hours prior to the discharge of that effluent to a surface watercourse.

(7) For the purpose of subsection (4), samples collected from a sampling point according to subsection (6), on an operating day after the 1st sample is collected from that sampling point according to subsection (6), shall be collected at a time which varies by at least 2 hours from the time of the previous sampling from that sampling point of that operating day.

(8) Despite subsection (4), each direct discharger shall collect each sample required to be collected from a storm water sampling point established under subsection 4(1), as a single grab sample.

(9) Subsections (6) and (8) do not apply in respect of samples collected under subsection 4(1) for the purpose of characterization analysis under section 6 to this Regulation.

(10) Despite subsection 3(8) of the General Effluent Monitoring Regulation, where a sample is collected for analysis for one or more parameters in any of the analytical test groups 15 to 18 and 28a as set out in Schedule 1 to the General Effluent Monitoring Regulation, the sample shall consist of three equal volume grab samples taken at intervals of at least two hours taken over an operating day.

(11) Each direct discharger shall combine grab samples collected as a sample in accordance with subsection (10), for analysis for parameters in analytical test group 15, as set out in Schedule 1 to the General Effluent Monitoring Regulation, in the laboratory immediately before analysis.

(11) Each direct discharger shall combine grab samples collected as a sample in accordance with subsection (10) for analysis for parameters in analytical test groups 16 to 18 and 28a, as set out in Schedule 1 to the General Effluent Monitoring Regulation, in a purge vessel in the laboratory immediately before analysis.

Characterization and Open Characterization

6.-(1)Each direct discharger shall collect a set of samples from each effluent sampling point established under section 4(1) for that discharger's plant, semi-annually, and shall perform a characterization and open characterization on each such set.

(2) A direct discharger whose plant is in the Quarries or Sand and Gravel category may collect a set of samples from each effluent sampling point of that discharger, annually, instead of the frequency set out in subsection (1).

(3) Each direct discharger shall collect a set of samples required to be collected under subsection (1) sufficient to perform the analyses required under subsection (8) from each effluent sampling point of that discharger.

(4) Despite subsection (1), a set of samples need not be collected, for the purpose of characterization, from a storm water sampling point established under subsection 4(1).

(5) The exemption set out in subsection (4) does not apply in relation to a direct discharger whose plant is in the Clay & Shale category.

(6) The characterization frequency as set out in subsection (2) does not apply in relation to the plant referred to in Schedule A as the Traprock Quarry, 3M Canada Inc., at Havelock Ontario, instead subsection (1) applies.

(7) For the purposes of subsection 4(3) of the General Effluent Monitoring Regulation, samples collected under this section are collected for characterization.

(8) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters listed under the Annual "A" column for direct dischargers in the Quarries and Sand & Gravel Categories or under the Semi-annual "SA" column for direct dischargers in all other categories of the Industrial Minerals Sector, of the category-specific monitoring schedule for that discharger's plant.

(9) In performing the analyses required by subsection (8), the direct discharger need only analyze for chromium hexavalent, analytical test group 11, if the total chromium concentration, analytical test group 9, as analyzed under subsection (8) is deemed to be greater than 1 milligram/litre.

(10) Subject to subsection (13), a direct discharger who does not use or store polychlorinated biphenyls need not analyze the sets of samples collected under subsection (1) for the parameters in analytical test group 27 as set out in the category-specific monitoring schedule for that discharger's plant.

(11) Subject to subsection (12) and (13), each direct discharger need only analyze a set of samples collected under subsection (1) for analytical test group 24 once during the period beginning the 1st day of May 1990 and ending on the 31st day of April, 1991.

(12) A direct discharger is exempt from the requirement under subsection (11) if, during the period beginning on the 1st day of October, 1988 and ending on the 31st day of January, 1989, the discharger collected a set of samples from each effluent stream of that discharger and analyzed such set for the parameters in analytical test group 24 as set out in Schedule 1 to the General Effluent Monitoring Regulation, and reported the results of those analyses to the Municipal Industrial Strategy for Abatement Office of the Ministry of the Environment.

(13) The exemptions set out in subsections (10) to (12) do not apply in relation to a direct discharger's plant where a kiln is used for the incineration of garbage or solvents.

(14) For the purposes of subsection (1), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (1) shall be collected no sooner than 45 days after the previous sampling under subsection (1) from that sampling point.

(15) Each set of samples collected under subsection (1), shall be collected on one of the days on which samples are collected under section 9.

Thrice Weekly Monitoring

7.-(1)On three operating days in each week, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (3) from each sampling point established under subsection 4(1) for that discharger's plant.

(2) For the purposes of subsection (1), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (1) shall be collected no sooner than twenty-four hours after the previous sampling under subsection (1) from that sampling point.

(3) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "3W", for the stream from which the set was collected, of the category-specific monitoring schedule for that discharger's plant.

(4) A direct discharger in the Quarries or Sand & Gravel category, is exempted from the monitoring obligations under this section if, the effluent from which a sample is required to be collected under subsection (1) is held in a settling pond for a minimum calculated retention time of 24 hours prior to discharge of that effluent to a surface watercourse.

Weekly Monitoring

8.-(1)This section applies only in relation to those plants which were exempted from the monitoring obligations under section 7.

(2) On one operating day in each month, each direct discharger shall collect a set of samples suifficient to perform the analyses required by subsection (3) from each sampling point established under subsection 4(1) for that discharger's plant.

(3) Each direct discharger shall analyze the sets of samples collected under subsection (1) for the parameters indicated in the column marked "3W", for the stream from which the set was collected, of the category-specific monitoring schedule for that discharger's plant.

(4) For the purposes of subsection (2), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (2) shall be collected no sooner than three days after the previous sampling under subsection (2) from that sampling point.

Monthly Monitoring

9.-(1)On one operating day in each month, on a day on which samples are collected under section 7 or 8, each direct discharger shall collect a set of samples sufficient to perform the analyses required by subsection (3) from each sampling point established under subsection 4(1) for that discharger's plant.

(2) For the purposes of subsection (1), samples collected from a sampling point after the first sample is collected from that sampling point under subsection (1) shall be collected no sooner than fifteen days after the previous sampling under subsection (1) from that sampling point.

(3) Each direct discharger shall analyze the samples collected under subsection (1) for the parameters indicated in the column marked "M" for the stream for which the set was collected, of the category-specific monitoring schedule for that discharger's plant.

(4) For the purpose of subsection (3), a direct discharger whose plant is in the Chemical Lime category need not analyze the samples collected under subsection (1) for ammonia plus ammonium, analytical test group 4a, unless explosives are used on site.

(5) For the purpose of subsection (3), a direct discharger whose plant is in the Chemical Lime category need not analyze the samples collected under subsection (1) for copper, analytical test group 9, and analytical test groups 14 and 20.

(6) The exemption set out in subsection (5) does not apply in relation to the plant referred to in Schedule A as the lime plant, Reiss Lime Company of Canada Limited, located in Spragge, Ontario.

(7) For the purpose of subsection (3), a direct discharger whose plant is in the Quarries category need not analyze the samples collected under subsection (1) for analytical test group 16.

(8) The exemption set out in subsection (7) does not apply in relation to the plant referred to in Schedule A as the Traprock Quarry, 3M Canada Inc., located in Havelock Ontario.

Monthly Monitoring - Storm Water

10.-(1)On one operating day in each month , each direct discharger shall collect a set of samples from each storm water sampling point of that discharger, sufficient to perform the analyses required by subsection (3).

(2) Where a direct discharger is in the Clay & Shale category and has been unable to collect a set of samples from a storm water sampling point as required by subsection (1) because of insufficient flow, the discharger shall collect a compensating set of samples from that sampling point during the next storm water discharge in respect of which the flow is sufficient and in respect of which a set of samples is not collected under subsection (1) and shall analyze the compensating set for the parameters referred to in subsection (3).

(3) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters indicated in the column marked "M/ at time of discharge", for the stream from which the set was collected, of the category-specific monitoring schedule for that discharger's plant.

(4) For the purposes of subsection (2), no more than two sets of compensating samples are required to be collected in any one month period.

Quality Control Monitoring

11.-(1)Each direct discharger shall select, for the purposes of this section, a minimum of one effluent sampling point from an effluent stream of that direct discharger in respect of which the monthly column of the category-specific monitoring schedule for that discharger's plant indicates the largest number of parameters to be analyzed.

(2) Once in each month, on a day on which samples are collected under section 9, each direct discharger shall, collect a duplicate sample for each sample collected on that day under sections 7 and 8 from the effluent sampling point selected under subsection (1), and shall analyze such sample for those parameters indicated in the column marked "3W" of the category specific monitoring schedule of that discharger's plant.

(3) Once in each quarter, on a day on which samples are collected under section 9 , each direct discharger shall,

(a) collect a duplicate sample for each sample collected on that day under section 9 from the effluent sampling point selected under subsection (1), and shall analyze such samples for those parameters indicated in the column marked "M" of the category-specific monitoring schedule for that discharger's plant;

(b) prepare, process and return to the laboratory, a travelling blank sample for each sample collected on that day under section 9 which is required to be analyzed for any parameters in analytical test groups 16 to 20 under section 9, and shall analyze such samples for those parameters in analytical test groups 16 to 20 indicated in the column marked "M" of the category-specific monitoring schedule for that discharger's plant; and

(c) prepare, process and return to the laboratory a travelling spiked blank sample for each sample collected on that day under section 9 which is required to be analyzed for any parameters in analytical test groups 16 to 20 under section 9, and shall analyze such samples for the parameters in analytical test groups 16 to 20 indicated in the column marked "M" of the category-specific monitoring schedule for that discharger's plant.

(4) For the purposes of subsections (2) and (3), samples shall be collected on a day on which samples are collected under subsection 10, in respect of a direct discharger whose plant is in the Clay & Shale category.

(5) Annually, on a day on which samples are collected under section 6 from the effluent sampling point selected under subsection (1), each direct discharger shall,

(a) prepare, process and return to the laboratory, a travelling blank sample for each sample collected on that day under section 6 which is required to be analyzed for any parameters in analytical test groups 16 and 20 under section 6, and shall analyze such samples for those parameters in analytical test groups 16 and 20 indicated in the column marked "A" or "SA" of the category-specific monitoring schedule for that discharger's plant; and

(b) prepare, process and return to the laboratory a travelling spiked blank sample for each sample collected on that day under section 6 which is required to be analyzed under section 6 for any parameters in analytical test groups 16 and 20 under section 6, and shall analyze such samples for those parameters in analytical test groups 16 and 20 indicated in the column marked "A" or "SA" of the category-specific monitoring schedule for that discharger's plant.

(6) Each direct discharger shall prepare each travelling spiked blank sample required to be analyzed by clauses (3)(b) and (4)(b) with a standard solution containing at least the parameters to be analyzed for, and shall record the concentration of each such parameter.

Toxicity Testing

12.-(1)For the purposes of this section, a toxicity test includes a fish toxicity test and a Daphnia magna acute lethality toxicity test, according to section 5 of the General Regulation.

(2) This section does not apply with respect to any storm water sampling point.

(3) The exemption set out in subsection (2) does not apply in respect of a direct discharger in the Clay & Shale category.

(4) Subject to subsections (5) and (6), on one operating day in each of the first the two quarters after this Regulation comes into force, each direct discharger shall collect a sample from each sampling point of that discharger established under subsection 4(1), sufficient to perform a toxicity test.

(5) Despite subsection (4), direct dischargers in the Quarries and Sand & Gravel categories need only collect a sample on one operating day during the first two quarters after this Regulation comes into force, from each sampling point of that discharger established under subsection 4(1), sufficient to perform a toxicity test.

(6) Subsection (5) does not apply in relation to the plant referred to in Schedule A as the Traprock Quarry, 3M Canada Inc. located in Havelock, Ontario.

(7) A sample collected from a sampling point after the first sample is collected from that sampling point under subsection (4) shall be collected no sooner that forty-five days after the previous sampling under subsection (4) from that sampling point.

(8) Each direct discharger shall make every reasonable effort to collect each sample collected under subsections (4) or (5) on a day on which a set of samples is collected under section 6 from the same sampling point.

(9) In failing to satisfy the provision under subsection (8), each direct discharger shall make every reasonable effort to collect each sample under subsections (4) or (5) on a day on which a set of samples is collected under section 9.

(10) Each direct discharger shall perform a toxicity test on each sample collected under subsections (4) and (5).

(11) If all tests performed under subsection (10) result in mortality of no more than two out of ten fish at all effluent concentrations, and the Daphnia magna acute lethality test results as non-lethal, then the direct discharger need not perform any further toxicity tests during the life of this Regulation.

(12) If any test performed under subsection (10) results in mortality of more than two out of ten fish, or provide a lethal result according to the Daphnia magna acute lethality test, then the direct discharger must collect samples from that sampling point for a further six consecutive months and perform toxicity testing on those samples.

(13) Despite subsection (12), those dischargers in the Sand & Gravel or Quarries category need only conduct three consecutive months of

sampling and toxicity testing if any test performed under subsection (10) results in mortality of more than two out of ten fish, or provides a lethal result according to the Daphnia magna acute lethality test.

(14) In the event that the toxicity testing cannot be completed within the first two quarters due to insufficient flow, then the quarters immediately following the quarter in which the requirements were not met will apply.

Flow Measurement

13.-(1)Each direct discharger shall at the time of each sampling under this Regulation from an effluent stream of that discharger, measure or estimate the flow of that stream at a location or set of locations representative of the flow at the sampling point established under section 4 for that stream, and shall record the measured or estimated data.

(2) Despite subsection 6(4) of the General Regulation, where a discharger collects a sample from an effluent stream in accordance with clause 5(4)(a) on an operating day, the requirement under subsection (1) to measure or estimate the flow of that stream at the time of that sampling is fulfilled if the discharger, measures or estimates the flow of that stream three times, at intervals of at least two hours over the course of the operating day.

(3) Each direct discharger, shall at the time of each batch discharge, estimate the duration and approximate volume of each batch discharge from an effluent stream to a surface watercourse.

(4) Where the flow of any effluent stream cannot be measured due to equipment malfunction or inclement weather, and all reasonable efforts have been made to comply with subsection (2), the direct discharger may satisfy the requirements of subsection (2) by estimating the total daily flow of that stream.

(5) Methods, devices or calculations for the measurement or estimation of flow shall be capable of accuracy to within plus or minus twenty percent of actual flow and a record of such shall be maintained.

(6) Where the flow or volume of discharge from any stream is estimated, all estimates shall be derived using engineering principles acceptable to the Director.

(7) In respect of subsections (4) and (5), every direct discharger shall field calibrate any methods, devices or calculations for the measurement or estimation of flow before the collection of the first set of samples required to be collected under this Regulation.

Reporting

14.-(1)Each direct discharger shall submit an initial report to the Director in respect of that direct discharger's plant, by the 1st day of the third month following filing or by the 1st day of the third month following the month in which the discharger's plant was added to Schedule A.

(2) Each direct discharger shall ensure that the plans submitted under paragraph 1 of subsection 7(1) of the General Effluent Monitoring Regulation identify by type each effluent stream on which the discharger establishes a sampling point under section 4.

(3) In addition to meeting the requirements of subsection 7(1) of the General Effluent Monitoring Regulation, each direct discharger shall include the following information in the initial report:

1. A description of methods for the measurement or estimation of flow, used to measure or estimate the flow under subsections 13(1) to 13(3), along with documentation sufficient to satisfy the Director that the method, device or calculation complies with the accuracy requirements of subsection 13(5) of this Regulation.

2. A description of the methods used for estimation of a calculated retention time, with respect to subsections 5(1) to 5(5), along with documentation sufficient to satisfy the Director that the method complies with the accuracy requirements under section 13(5).

3. A statement indicating the quantity of final product(s) expected to be manufactured or mined during the period in which this regulation is in force, along with product specifications of such final product(s).

4. A statement documenting the types of chemicals used or stored on site, including chemical explosives, lubricants, coolants, pigments or other additives, specifying the trade names or chemical names of each.

(4) For the purpose of subsections (1) to (3), each direct discharger whose plant is designated as a non-monitoring site according to Schedule A, need only comply with paragraphs 1, 2 and 3 of section 7(1) of the General Effluent Monitoring Regulation and paragraphs 3 and 4 of

section (3) to this Regulation.

(5) Each direct discharger whose plant is designated as a non-monitoring site according to Schedule A, shall report in writing to the Director the results of all flow measurements and estimations and of all chemical analyses required to be done, during the period beginning the 1st day of May, 1990 and ending on the 31st day of April 1991, by a permit to take water given under section 20 of the Ontario Water Resources Act or by an approval given under section 24 of the Ontario Water Resources Act, within thirty days after making the measurement, estimation or analysis.

(6) Each direct discharger shall report any significant changes to the information submitted under subsections (1) to (3) to the Director in writing within thirty days after the end of the month during which the change occurs including any redirection of or change in the type of an effluent stream named in the category-specific monitoring schedule for that discharger's plant.

(7) Each direct discharger shall notify the Director in writing of any change of name or ownership of its plant within thirty days after this regulation comes into force or within thirty days after any such change.

(8) Each direct discharger shall, no later than thirty days after the event, notify the Director in writing of any process change that occurs after the day this Regulation comes into force and that may adversely affect the quality of the effluent in any effluent stream named in the category-specific monitoring schedule for that discharger's plant.

(9) Each direct discharger shall report to the Director, on a floppy diskette in a format acceptable to the Director and by hard copy generated from that diskette and signed by the discharger, the results of all analyses performed by or on behalf of the discharger under sections 6 to 11 to this Regulation and under subsection 4(18) of the General Effluent Monitoring Regulation, including the data recorded under subsection 11(6) and all positive numerical values at or above the analytical method detection limits calculated by the laboratory performing the analysis, together with the day on which each sample was collected and the method used to collect each sample.

(10) Each direct discharger shall, in accordance with subsection 7(6) of the General Effluent Monitoring Regulation, report to the Director the toxicity test information obtained under section 12, together with the date on which each sample was collected under subsection 12.

(11) For the purpose of subsection (10), each direct discharger shall report the toxicity test information obtained in respect of each sample collected under section 12 within sixty days after the last day of the week in

which the sample was collected, on a floppy diskette in a format acceptable to the Director and by hard copy generated from that diskette and signed by the discharger.

(12) Each direct discharger shall report to the Director the flow measurement information recorded under subsection 13(1) in respect of each effluent stream and effluent discharge, and the date on which each flow was measured or estimated.

(13) Each direct discharger shall report to the Director the date, duration and approximate volume of each batch discharge recorded under subsection 13(3) in respect of each effluent stream and effluent discharge, and the date on which each flow was measured or estimated.

(14) Where a direct discharger has established a storm water sampling point under subsection 4(1), that discharger shall report to the Director the date of each storm event.

(15) Subsection (14) does not apply with respect to a direct discharger whose plant is in the Clay & Shale category.

(16) Within thirty days after the end of each quarter, each direct discharger shall submit to the Director in writing, a flow discharge report which shall include;

(a) an estimate of the total volume of that discharger's final discharge to a surface watercourse from each effluent stream type in accordance with the effluent stream types listed in Schedule A of that discharger's plant,

(b) a description of the method used to calculate the estimates provided under clause (16)(a), and

(c) the flow reports referred to in subsections (12) to (14).

(17) Each direct discharger shall, with respect to each method, device and calculation to be used to measure or estimate the flow of an effluent stream under subsection 15(1) and 15(3), submit to the Director, no later than thirty days before the first use of the methods, device or calculation, documentation sufficient to satisfy the Director that the methods, device or calculation meet the accuracy requirement of subsection 15(5).

(18) Each direct discharger shall submit to the Director, at least thirty days before collection of the first sample , a schedule of months of operation if the plant operates on a seasonal basis, and intended sampling dates by sampling point location for all sampling to be done under sections 6 to 12.

(19) Each direct discharger shall make every reasonable effort to follow the schedule submitted by the direct discharger under subsection (18) but if the schedule cannot be followed as submitted, the direct discharger shall notify the Director promptly of any change in dates.

(20) Each direct discharger shall keep records of all sampling required by this Regulation, including, for each sample, the date and time of collection, sampling procedures used, the amount of sample dilution by preservative if dilution exceeds one per cent, and any incident likely to affect an analytical result.

(21) Each direct discharger shall record the results of all maintenance and calibration performed on sampling equipment used in meeting the requirements of this Regulation.

(22) Each direct discharger shall keep records of all analytical methods used in meeting the requirements of this regulation.

(23) Each direct discharger shall submit a report to the Director detailing the date, duration and cause of each sampling, toxicity testing, analytical and flow measurement malfunction or other problem that interferes with fulfilling the requirements of this Regulation, together with a description of any remedial action taken, within thirty days after end of the month on which the malfunction or problem occurs.

(24) Each direct discharger shall keep all records and reports, required by this Regulation to be kept or made, for a period of two years following the date of the last report submitted to the Director under this section.

Commencement

15.-(1)This Regulation, except sections 6 to 13 come into force on the first day on which it if filed.

(2) Sections 6 to 13 come into force on the first day of May, 1990.

Revocation

16.-(1)Sections 4 to 13 are revoked on the 1st day of May, 1991.

LEGEND FOR SCHEDULES A TO M

3W - Thrice weekly

M - Monthly

SA - Semi-annually

A - Annually

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
CEMENT CATEGORY				
1	LaFarge Canada Inc.	Bath, Ontario	Cement Plant/Limestone Quarry	C
2	LaFarge Canada Inc.	Woodstock, Ontario	Cement Plant/Limestone Quarry	C
3	Lake Ontario Cement	Picton, Ontario	Cement Plant/Limestone Quarry	C
4	St. Lawrence Cement	Mississauga, Ontario	Cement Plant	C
5	St. Marys Cement Company	Bowmanville, Ontario	Cement Plant/Limestone Quarry	C
6	St. Marys Cement Company	St. Marys, Ontario	Cement Plant/Limestone Quarry	C
CHEMICAL LIME CATEGORY				
7	BeachviLime Limited	Beachville, Ontario	Lime Plant/Limestone Quarry (East Plant)	D
8	BeachviLime Limited	Beachville, Ontario	Lime Plant/Limestone Quarry (West Plant)	D
9	Guelph DoLime Limited	Guelph, Ontario	Lime Plant/Dolomite Quarry	D
10	Reiss Lime Co. of Canada Ltd.	Spragge, Ontario	Lime Plant	D
11	Steetley Lime and Aggregates (Steetley Quarry Prod. Inc.)	Flamborough, Ontario	Lime Plant/Limestone Quarry	D
12	Stelco Chemical Lime Works	Ingersoll, Ontario	Lime Plant/Limestone Quarry	D

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
CLAY AND SHALE CATEGORY				
13	Brampton Brick Ltd.	Brampton, Ontario	Brick Plant/Clay Pit	E
14	Canada Brick Company	Burlington, Ontario	Brick Plant/Clay Pit	E
15	Canada Brick Company	Cooksville, Ontario	Brick Plant/Clay Pit	E
16	Canada Brick Company	Gloucester, Ontario	Brick Plant/Clay Pit	E
17	Canada Brick Company	Streetsville, Ontario	Brick Plant/Clay Pit	E
GRAPHITE CATEGORY				
18	Cal Graphite Corporation	Kearney, Ontario	Graphite Mine/Mill	F
19	North Coast Industries Ltd.	Maria Twp., Ontario	Graphite Mine/Mill	F
GYPSUM CATEGORY				
20	C.G.C. Limited	Hagersville, Ontario	Gypsum Mine/Processing Plant	G
21	Domtar Construction Materials	Caledonia, Ontario	Gypsum Mine/Processing Plant	G
22	Westroc Industries Limited	Drumbo, Ontario	Gypsum Mine	G
MAGNESIUM CATEGORY				
23	Timminco Ltd. (Timminco Metals Division)	Haley Station, Ontario	Dolomite Quarry/Magnesium Plant	H

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY				
24	Amherst Quarries (1969) Ltd.	Amherstburg, Ontario	Limestone Quarry	I
25	B&M Carriers Ltd. (Non-monitoring Site)	N. Plantagenet, Ontario	Limestone Quarry	I
26	B&M Carriers Ltd. (Non-monitoring Site)	S. Plantagenet, Ontario	Limestone Quarry	I
27	Beaver Road Builders Ltd. (Non-monitoring Site)	Gloucester, Ontario	Rideau Road Quarry	I
28	Bertrand & Frere Construction Co. Ltd. (Non-monitoring Site)	L'Original, Ontario	Limestone Quarry	I
29	Bertrand & Frere Construction Co. Ltd. (Non-monitoring Site)	Longueil Twp., Ontario	Limestone Quarry	I
30	Bertrand & Frere Construction Co. Ltd. (Non-monitoring Site)	S. Plantagenet, Ontario	Limestone Quarry	I
31	Thomas Cavanagh Construction Ltd. (Non-monitoring Site)	Ashton, Ontario	Limestone Quarry	I
32	Cayuga Materials & Construction Co. (Non-monitoring Site)	Cayuga, Ontario	Limestone Quarry	I
33	Cedarhurst Quarries and Crushing Ltd. (Non-monitoring Site)	Coboconk, Ontario	Limestone Quarry	I
34	Allan G. Cook	Coldwater, Ontario	Limestone Quarry	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY (continued)				
35	Cornwall Gravel Co. Ltd.	Cornwall, Ontario	Limestone Quarry	I
36	Cornwall Gravel Co. Ltd.	Cambridge Twp., Ontario	Clarence Quarry	I
37	Cornwall Gravel Co. Ltd. (Non-monitoring Site)	Winchester, Ontario	Winchester Quarry	I
38	Cruickshank Construction Ltd. (Non-monitoring Site)	Amherstview, Ontario	Frontenac Aggregates & Construction	I
39	Cruickshank Construction Ltd.	Kingston, Ontario	Frontenac Aggregates & Construction	I
40	Cruickshank Construction Ltd. (Non-monitoring Site)	Green Valley, Ontario	Glengarry Aggregates & Concrete	I
41	Cruikshank Contruction Ltd. (Non-monitoring Site)	Lancaster, Ontario	Leslie Cruickshank	I
42	Cruikshank Contruction Ltd. (Non-monitoring Site)	Williamsburg, Ontario	Limestone Quarry	I
43	Cruikshank Contruction Ltd. (Non-monitoring Site)	Kenyon, Ontario	Limestone Quarry	I
44	Dechan Construction Ltd. (Non-monitoring Site)	Beckwith Twp., Ontario	Miller Paving	I
45	James Dick Construction Ltd. (Non-monitoring Site)	Brechin, Ontario	James Dick Aggregates	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY (continued)				
46	George W. Drummond Ltd. (Non-monitoring Site)	Nepean, Ontario	Limestone Quarry	I
47	Dufferin Aggregates	Milton, Ontario	Limestone Quarry	I
48	Dunnville Rock Products Ltd. (Non-monitoring Site)	Dunnville, Ontario	Limestone Quarry	I
49	Dymond Clay Products Ltd. (Non-monitoring Site)	Haileybury, Ontario	Limestone Quarry	I
50	Flamboro Quarries Ltd.	Flamborough, Ontario	Limestone Quarry	I
51	Fowler Construction Co. Ltd. (Non-monitoring Site)	Twp. of Mara, Ontario	Broken Front Quarry	I
52	Francon Ottawa Div. of Lafarge Canada Inc.	Gloucester, Ontario	Limestone Quarry	I
53	Gormley Aggregates Ltd. (Non-monitoring Site)	Buckhorn, Ontario	Limestone Quarry	I
54	Gormley Aggregates Ltd.	Carden Twp., Ontario	Limestone Quarry	I
55	Griffin Brothers Ltd. (Non-monitoring Site)	Storrington Twp., Ontario	Battersea Quarry	I
56	Griffin Brothers Ltd. (Non-monitoring Site)	Pittsburgh Twp., Ontario	Joyceville Quarry	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY (continued)				
57	Griffin Brothers Ltd. (Non-monitoring Site)	North Crosby Twp., Ontario	Lynns Quarry	I
58	Halton Crushed Stone Ltd. (Non-monitoring Site)	Milton, Ontario	Limestone Quarry	I
59	Hard Rock Paving Co. Ltd.	Port Colborne, Ontario	Limestone Quarry	I
60	Indusmin	Blue Mountain, Ontario	Nepheline Syenite Quarry/ Processing Plant	I
61	Indusmin (Non-monitoring Site)	Nephton, Ontario	Nepheline Syenite Quarry/ Processing Plant	I
62	Indusmin (Non-monitoring Site)	Badgeley Island, Ontario	Silica Operations	I
63	Karson Kartage & Konstruction Co. Ltd. (Non-monitoring Site)	West Carleton, Ontario	West Carlton Sand	I
64	George Kennedy (Non-monitoring Site)	West Carlton, Ontario	Limestone Quarry	I
65	E.C. King Contracting (Non-monitoring Site)	Sydenham Twp., Ontario	Limestone Quarry	I
66	M.J. Labelle Company Ltd. (Non-monitoring Site)	Moosonee, Ontario	Limestone Quarry	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY (continued)				
67	Markham Sand and Gravel Division of Miller Paving (Non-monitoring Site)	Brechin, Ontario	Limestone Quarry	I
68	Markham Sand and Gravel Div. of Miller Paving Ltd. (Non-monitoring Site)	Sophiasburg Twp., Ontario	Limestone Quarry	I
69	H.J. McFarland Construction Co. (Non-monitoring Site)	Clarence Twp., Ontario	Limestone Quarry	I
70	H.J. McFarland Construction Co. (Non-monitoring Site)	Nepean, Ontario	George Wimpey	I
71	H.J. McFarland Construction Co. (Non-monitoring Site)	Tyendinaga, Ontario	Limestone Quarry	I
72	McKendry Quarries Ltd. (Non-monitoring Site)	Kingston, Ontario	Glen Quarry	I
73	McKendry Quarries Ltd. (Non-monitoring Site)	Westbrooke, Ontario	Westbrook Quarry	I
74	Milton Limestone	Milton, Ontario	Limestone Quarry	I
75	Nelson Aggregate Company (Non-monitoring Site)	Beamsville, Ontario	Lincoln Quarry	I
76	Nelson Aggregate Company	Burlington, Ontario	Nelson Quarry	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY (continued)				
77	Nelson Aggregate Company	Uhthoff, Ontario	Uhthoff Quarry	I
78	Nelson Granite (Non-monitoring Site)	Vermilion Bay, Ontario	Limestone Quarry	I
79	Norfolk Quarries Company (Non-monitoring Site)	Pt. Dover, Ontario	Trent Valley Sand & Stone Ltd.	I
80	Permanent Concrete (Non-monitoring Site)	Elizabethtown, Ontario	Brockville Quarry	I
81	Permanent Concrete	Cornwall, Ontario	Cornwall Quarry	I
82	Permanent Concrete (Non-monitoring Site)	Gloucester, Ontario	Hawthorne Quarry	I
83	Permanent Concrete (Non-monitoring Site)	Gloucester, Ontario	Navan Quarry	I
84	Permanent Concrete (Non-monitoring Site)	Ottawa, Ontario	Orleans Quarry	I
85	Permanent Concrete (Non-monitoring Site)	Napanee, Ontario	Selby Quarry	I
86	Permanent Concrete (Non-monitoring Site)	Kingston, Ontario	Violet Road Quarry	I
87	Port Colborne Quarries Ltd. (Non-monitoring Site)	Port Colborne, Ontario	Limestone Quarry	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY (continued)				
88	Seeley & Arnill Aggregates Ltd. (Non-monitoring Site)	Duntroon, Ontario	Limestone Quarry	I
89	Smiths Construction Co. (Non-monitoring Site)	Arnprior, Ontario	Limestone Quarry	I
90	Spratt Sand & Gravel (Non-monitoring Site)	Stittsville, Ontario	Limestone Quarry	I
91	St. Lawrence Cement Inc. (Non-monitoring Site)	Colborne, Ontario	Limestone Quarry	I
92	Standard Aggregates Inc. (Non-monitoring Site)	Brechin, Ontario	Limestone Quarry	I
93	Standard Aggregates Inc. (Non-monitoring Site)	Gore Bay, Ontario	Limestone Quarry	I
94	Standard Aggregates Inc. (Non-monitoring Site)	Hagersville, Ontario	Limestone Quarry	I
95	Steeprock Calcite (Non-monitoring Site)	Tatlock, Ontario	Limestone Quarry	I
96	Steetley Quarry Products Inc. (Non-monitoring Site)	Flamborough, Ontario	Limestone Quarry	I
97	Steetley Quarry Products Inc. (Non-monitoring Site)	Niagara Falls, Ontario	Queenston Quarry	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY (continued)				
98	G. Tackaberry & Sons Construction (Non-monitoring Site)	Elizabethtown Twp., Ontario	Limestone Quarry	I
99	G. Tackaberry & Sons Construction (Non-monitoring Site)	Rear of Yonge & Escott Twp., Ontario	Lowson Quarry	I
100	G. Tackaberry & Sons Construction (Non-monitoring Site)	Kitely Twp., Ontario	Willows Quarry	I
101	G. Tackaberry & Sons Construction (Non-monitoring Site)	Wolford Twp., Ontario	Jasper Quarry	I
102	Taro Aggregates Ltd. (Non-monitoring Site)	Stoney Creek, Ontario	Limestone Quarry	I
103	3M Canada Ltd.	Havelock, Ontario	Traprock Quarry Processing Plant	I
104	R.W. Tomlinson Ltd.	Nepean, Ontario	Limestone Quarry	I
105	United Aggregates Ltd. (Non-monitoring Site)	Acton, Ontario	Limestone Quarry	I
106	United Aggregates Ltd. (Non-monitoring Site)	Gloucester, Ontario	Limestone Quarry	I
107	Walker Industries	Fort Erie, Ontario	Ridgemount Quarries Ltd.	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
QUARRIES CATEGORY (continued)				
108	Walker Industries (Non-monitoring Site)	Vineland, Ontario	Vineland Quarries & Crushed Stone Ltd.	I
109	Walker Industries (Non-monitoring Site)	Thorold, Ontario	Walker Brothers Quarries	I
110	Warren Paving and Materials (Non-monitoring Site)	Cornwall, Ontario	Dibblee Construction Ltd.	I
111	Warren Paving and Materials (Non-monitoring Site)	Kingston, Ontario	Dibblee Construction Ltd.	I
112	Warren Paving and Materials	Gloucester, Ontario	Dibblee Construction Ltd. Boyce Quarry	I
113	Warren Paving and Materials (Non-monitoring Site)	Nepean, Ontario	Dibblee Construction Ltd.	I
114	Warren Paving and Materials (Non-monitoring Site)	Montague, Ontario	Dibblee Construction Ltd.	I
115	Warren Paving and Materials (Non-monitoring Site)	Goulbourn Twp., Stittsville, Ontario	Dibblee Construction Ltd.	I
116	Waterford Sand & Gravel Ltd. (Non-monitoring Site)	Stoney Creek, Ontario	Limestone Quarry	I
117	Wood's Sand and Gravel Ltd.	Kingston, Ontario	Limestone Quarry	I

ONTARIO MINERAL INDUSTRY SECTOR: GROUP B

SCHEDULE A

ITEM	OWNER AS OF ??????????, 1989	LOCATION	PLANT	CATEGORY-SPECIFIC MONITORING SCHEDULE
SAND AND GRAVEL CATEGORY				
118	Frank Kling Ltd.	Seaforth, Ontario	Sand and Gravel Pit	J
119	Kam Aggregates Ltd.	Kaministiqua, Ontario	Sand and Gravel Pit	J
120	Lempiala Sand & Gravel Ltd.	Thunderbay, Ontario	Sand and Gravel Pit	J
121	Oxford Sand and Gravel Ltd.	Woodstock, Ontario	Sand and Gravel Pit	J
122	Seely & Arnill Aggregrates Ltd.	Durham, Ontario	Durham Stone & Paving	J
123	Standard Aggregates Inc.	Guelph, Ontario	Sand and Gravel Pit	J
TALC CATEGORY				
124	Canada Talc Ltd.	Madoc, Ontario	Underground Mine	K
125	Luzenac Inc.	Timmins, Ontario	Open Pit Mine	K

SCHEDULE B - CHARACTERIZATION MONITORING PARAMETERS - INDUSTRIAL MINERALS SECTOR

COLUMN 1		COLUMN 2	COLUMN 3
ANALYTICAL TEST GROUP		PARAMETERS	CAS #s
#	NAME		
2	Total cyanide	Total cyanide	57-12-5
3	Hydrogen ion (pH)	Hydrogen ion (pH)	N/A
4a	Nitrogen	Ammonia plus Ammonium	N/A
		Total Kjeldahl nitrogen	N/A
4b		Nitrate + Nitrite	N/A
5a	Organic carbon	Dissolved organic carbon (DOC)	N/A
5b		Total organic carbon (TOC)	N/A
6	Total phosphorus	Total phosphorus	7723-14-0
7	Specific conductance	Specific conductance	N/A
8	Suspended solids	Total suspended solids (TSS)	N/A
		Volatile suspended solids (VSS)	N/A
9	Total metals	Aluminum	7429-90-5
		Beryllium	7440-41-7
		Cadmium	7440-43-9
		Chromium	7440-47-3
		Cobalt	7440-48-4
		Copper	7440-50-8
		Lead	7439-92-1
		Molybdenum	7439-98-7
		Nickel	7440-02-0
		Silver	7440-22-4
		Thallium	7440-28-0
		Vanadium	7440-62-2
		Zinc	7440-66-6
10	Hydrides	Antimony	7440-36-0
		Arsenic	7440-38-2
		Selenium	7782-49-2
11	Chromium (Hexavalent)	Chromium (Hexavalent)	7440-47-3

SCHEDULE B - CHARACTERIZATION MONITORING PARAMETERS - INDUSTRIAL MINERALS SECTOR

COLUMN 1		COLUMN 2	COLUMN 3
ANALYTICAL TEST GROUP		PARAMETERS	CAS #s
#	NAME		
12	Mercury	Mercury	7439-97-6
14	Phenolics (4AAP)	Phenolics (4AAP)	N/A
15	Sulphide	Sulphide	N/A
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	79-34-5
		1,1,2-Trichloroethane	79-00-5
		1,1-Dichloroethane	75-34-3
		1,1-Dichloroethylene	75-35-4
		1,2-Dichlorobenzene	95-50-1
		1,2-Dichloroethane (Ethylene dichloride)	107-06-2
		1,2-Dichloropropane	78-87-5
		1,3-Dichlorobenzene	541-73-1
		1,4-Dichlorobenzene	106-46-7
		Bromoform	75-25-2
		Bromomethane	74-83-9
		Carbon tetrachloride	56-23-5
		Chlorobenzene	108-90-7
		Chloroform	67-66-3
		Chloromethane	74-87-3
		Cis-1,3-Dichloropropylene	10061-01-5
		Dibromochloromethane	124-48-1
		Ethylene dibromide	106-93-4
		Methylene chloride	75-09-2
		Tetrachloroethylene (Perchloroethylene)	127-18-4
		Trans-1,2-Dichloroethylene	156-60-5
		Trans-1,3-Dichloropropylene	10061-02-6
		Trichloroethylene	79-01-6
		Trichlorofluoromethane	75-69-4
		Vinyl chloride (Chloroethylene)	75-01-4
17	Volatiles, Non-Halogenated	Benzene	71-43-2
		Styrene	100-42-5
		Toluene	108-88-3
		o-Xylene	95-47-6
		m-Xylene and p-Xylene	108-38-3 & 106-42-3

SCHEDULE B - CHARACTERIZATION MONITORING PARAMETERS - INDUSTRIAL MINERALS SECTOR

COLUMN 1		COLUMN 2	COLUMN 3
ANALYTICAL TEST GROUP		PARAMETERS	CAS #s
#	NAME		
19	Extractables, Base Neutral	Acenaphthene	83-32-9
		5-nitro Acenaphthene	602-87-9
		Acenaphthylene	208-96-8
		Anthracene	120-12-7
		Benz(a)anthracene	56-55-3
		Benzo(a)pyrene	50-32-8
		Benzo(b)fluoranthene	205-99-2
		Benzo(g,h,i)perylene	191-24-2
		Benzo(k)fluoranthene	207-08-9
		Camphene	79-92-5
		1-Chloronaphthalene	90-13-1
		2-Chloronaphthalene	91-58-7
		Chrysene	218-01-9
		Dibenz(a,h)anthracene	53-70-3
		Fluoranthene	206-44-0
		Fluorene	86-73-7
		Indeno(1,2,3-cd)pyrene	193-39-5
		Indole	120-72-9
		1-Methylnaphthalene	90-12-0
		2-Methylnaphthalene	91-57-6
		Naphthalene	91-20-3
		Perylene	198-55-0
		Phenanthrene	85-01-8
		Pyrene	129-00-0
		Benzyl butyl phthalate	85-68-7
		Bis(2-ethylhexyl) phthalate	117-81-7
		Di-n-butyl phthalate	84-74-2
		4-Bromophenyl phenyl ether	101-55-3
		4-Chlorophenyl phenyl ether	7005-72-3
		Bis(2-chloroisopropyl)ether	108-60-1
		Bis(2-chloroethyl)ether	111-44-4
		2,4-Dinitrotoluene	121-14-2
		2,6-Dinitrotoluene	606-20-2
		Bis(2-chloroethoxy)methane	111-91-1
		Diphenylamine	122-39-4
		N-Nitrosodiphenylamine	86-30-6
		N-Nitrosodi-n-propylamine	621-64-7

SCHEDULE B - CHARACTERIZATION MONITORING PARAMETERS - INDUSTRIAL MINERALS SECTOR

	COLUMN 1	COLUMN 2	COLUMN 3
ANALYTICAL TEST GROUP		PARAMETERS	CAS #s
#	NAME		
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	4901-51-3
		2,3,4,6-Tetrachlorophenol	58-90-2
		2,3,5,6-Tetrachlorophenol	935-95-5
		2,3,4-Trichlorophenol	15950-66-0
		2,3,5-Trichlorophenol	933-78-8
		2,4,5-Trichlorophenol	95-95-4
		2,4,6-Trichlorophenol	88-06-2
		2,4-Dimethyl phenol	105-67-9
		2,4-Dinitrophenol	51-28-5
		2,4-Dichlorophenol	120-83-2
		2,6-Dichlorophenol	87-65-0
		4,6-Dinitro-o-cresol	534-52-1
		2-Chlorophenol	95-57-8
		4-Chloro-3-methylphenol	59-50-7
		4-Nitrophenol	100-02-7
		m-Cresol	108-39-4
		o-Cresol	95-48-7
		p-Cresol	106-44-5
		Pentachlorophenol	87-86-5
		Phenol	108-95-2
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
		Octachlorodibenzo-p-dioxin	326-88-7
		Octachlorodibenzofuran	Unavailable
		Total heptachlorinated dibenzo-p-dioxins	Unavailable
		Total heptachlorinated dibenzofurans	Unavailable
		Total hexachlorinated dibenzo-p-dioxins	34465-46-8
		Total hexachlorinated dibenzofurans	Unavailable
		Total pentachlorinated dibenzo-p-dioxins	Unavailable
		Total pentachlorinated dibenzofurans	Unavailable
		Total tetrachlorinated dibenzo-p-dioxins	Unavailable
		Total tetrachlorinated dibenzofurans	Unavailable
25	Solvent Extractables	Oil and grease	
27	Polychlorinated Biphenyls (PCBs) (Total)	PCBs (Total)	Unavailable
IM1	Chloride	Chloride	

SCHEDULE B - CHARACTERIZATION MONITORING PARAMETERS - INDUSTRIAL MINERALS SECTOR

	COLUMN 1	COLUMN 2	COLUMN 3
ANALYTICAL TEST GROUP		PARAMETERS	CAS #s
#	NAME		
IM2	Fibrous Chrysotile	Fibrous Chrysotile	
IM3	Fluoride	Fluoride	
IM4	Sulphate	Sulphate	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE C - CEMENT CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Cement Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
2	Total cyanide	Total cyanide			XXX			XXX	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX			XXX			XXX
4a	Nitrogen	Ammonia plus Ammonium		XXX				XXX	XXX
		Total Kjeldahl nitrogen							
4b		Nitrate + Nitrite			XXX			XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX	
5b		Total organic carbon (TOC)							
6	Total phosphorus	Total phosphorus			XXX			XXX	
7	Specific conductance	Specific conductance			XXX			XXX	XXX
8	Suspended solids	Total suspended solids (TSS)	XXX			XXX			XXX
		Volatile suspended solids (VSS)							
9	Total metals	Aluminum			XXX			XXX	
		Beryllium			XXX			XXX	
		Cadmium		XXX				XXX	XXX
		Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Lead			XXX			XXX	
		Molybdenum			XXX			XXX	
		Nickel			XXX			XXX	
		Silver			XXX			XXX	
		Thallium			XXX			XXX	
		Vanadium			XXX			XXX	
		Zinc			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE C - CEMENT CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Cement Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)			XXX			XXX	
12	Mercury	Mercury			XXX			XXX	
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX			XXX		XXX
15	Sulphide	Sulphide			XXX			XXX	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX	
		1,1,2-Trichloroethane			XXX			XXX	
		1,1-Dichloroethane			XXX			XXX	
		1,1-Dichloroethylene			XXX			XXX	
		1,2-Dichlorobenzene			XXX			XXX	
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX	
		1,2-Dichloropropane			XXX			XXX	
		1,3-Dichlorobenzene			XXX			XXX	
		1,4-Dichlorobenzene			XXX			XXX	
		Bromoform			XXX			XXX	
		Bromomethane			XXX			XXX	
		Carbon tetrachloride			XXX			XXX	
		Chlorobenzene			XXX			XXX	
		Chloroform			XXX			XXX	
		Chloromethane			XXX			XXX	
		Cis-1,3-Dichloropropylene			XXX			XXX	
		Dibromochloromethane			XXX			XXX	
		Ethylene dibromide			XXX			XXX	
		Methylene chloride			XXX			XXX	
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX	
		Trans-1,2-Dichloroethylene			XXX			XXX	
		Trans-1,3-Dichloropropylene			XXX			XXX	
		Trichloroethylene			XXX			XXX	
		Trichlorofluoromethane			XXX			XXX	
		Vinyl chloride (Chloroethylene)			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE C - CEMENT CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Cement Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX	
		Styrene			XXX			XXX	
		Toluene			XXX			XXX	
		o-Xylene			XXX			XXX	
		m-Xylene and p-Xylene			XXX			XXX	
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX	
		5-nitro Acenaphthene			XXX			XXX	
		Acenaphthylene			XXX			XXX	
		Anthracene			XXX			XXX	
		Benz(a)anthracene			XXX			XXX	
		Benzo(a)pyrene			XXX			XXX	
		Benzo(b)fluoranthene			XXX			XXX	
		Benzo(g,h,i)perylene			XXX			XXX	
		Benzo(k)fluoranthene			XXX			XXX	
		Camphene			XXX			XXX	
		1-Chloronaphthalene			XXX			XXX	
		2-Chloronaphthalene			XXX			XXX	
		Chrysene			XXX			XXX	
		Dibenz(a,h)anthracene			XXX			XXX	
		Fluoranthene			XXX			XXX	
		Fluorene			XXX			XXX	
		Indeno(1,2,3-cd)pyrene			XXX			XXX	
		Indole			XXX			XXX	
		1-Methylnaphthalene			XXX			XXX	
		2-Methylnaphthalene			XXX			XXX	
		Naphthalene			XXX			XXX	
		Perylene			XXX			XXX	
		Phenanthrene			XXX			XXX	
		Pyrene			XXX			XXX	
		Benzyl butyl phthalate			XXX			XXX	
		Bis(2-Ethylhexyl) phthalate			XXX			XXX	
		Di-n-butyl phthalate			XXX			XXX	
		4-Bromophenyl phenyl ether			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE C - CEMENT CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Cement Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
19	Extractables, Base Neutral (continued)	4-Chlorophenyl phenyl ether			XXX			XXX	
		Bis(2-Chloroisopropyl)ether			XXX			XXX	
		Bis(2-Chloroethyl)ether			XXX			XXX	
		2,4-Dinitrotoluene			XXX			XXX	
		2,6-Dinitrotoluene			XXX			XXX	
		Bis(2-Chloroethoxy)methane			XXX			XXX	
		Diphenylamine			XXX			XXX	
		N-Nitrosodiphenylamine			XXX			XXX	
		N-Nitrosodi-n-propylamine			XXX			XXX	
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX	
		2,3,4,6-Tetrachlorophenol			XXX			XXX	
		2,3,5,6-Tetrachlorophenol			XXX			XXX	
		2,3,4-Trichlorophenol			XXX			XXX	
		2,3,5-Trichlorophenol			XXX			XXX	
		2,4,5-Trichlorophenol			XXX			XXX	
		2,4,6-Trichlorophenol			XXX			XXX	
		2,4-Dimethyl phenol			XXX			XXX	
		2,4-Dinitrophenol			XXX			XXX	
		2,4-Dichlorophenol			XXX			XXX	
		2,6-Dichlorophenol			XXX			XXX	
		4,6-Dinitro-o-cresol			XXX			XXX	
		2-Chlorophenol			XXX			XXX	
		4-Chloro-3-methylphenol			XXX			XXX	
		4-Nitrophenol			XXX			XXX	
		m-Cresol			XXX			XXX	
		o-Cresol			XXX			XXX	
		p-Cresol			XXX			XXX	
		Pentachlorophenol			XXX			XXX	
		Phenol			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE C - CEMENT CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Cement Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzofuran			XXX			XXX	
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total heptachlorinated dibenzofurans			XXX			XXX	
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total hexachlorinated dibenzofurans			XXX			XXX	
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total pentachlorinated dibenzofurans			XXX			XXX	
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total tetrachlorinated dibenzofurans			XXX			XXX	
25	Solvent Extractables	Oil and grease	XXX			XXX			XXX
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)			XXX			XXX	
28a	Open Characterization - Volatiles				XXX			XXX	
28b	Open Characterization - Extractables				XXX			XXX	
29	Open Characterization - Elemental	Aluminum			XXX			XXX	
		Antimony			XXX			XXX	
		Arsenic			XXX			XXX	
		Barium			XXX			XXX	
		Beryllium			XXX			XXX	
		Bismuth			XXX			XXX	
		Boron			XXX			XXX	
		Cadmium			XXX			XXX	
		Calcium			XXX			XXX	
		Cerium			XXX			XXX	
		Cesium			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE C - CEMENT CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Cement Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Dysprosium			XXX			XXX	
		Erbium			XXX			XXX	
		Europium			XXX			XXX	
		Gadolinium			XXX			XXX	
		Gallium			XXX			XXX	
		Germanium			XXX			XXX	
		Gold			XXX			XXX	
		Hafnium			XXX			XXX	
		Holmium			XXX			XXX	
		Indium			XXX			XXX	
		Iridium			XXX			XXX	
		Iron			XXX			XXX	
		Lanthanum			XXX			XXX	
		Lead			XXX			XXX	
		Lithium			XXX			XXX	
		Lutetium			XXX			XXX	
		Magnesium			XXX			XXX	
		Manganese			XXX			XXX	
		Mercury			XXX			XXX	
		Molybdenum			XXX			XXX	
		Neodymium			XXX			XXX	
		Nickel			XXX			XXX	
		Niobium			XXX			XXX	
		Osmium			XXX			XXX	
		Palladium			XXX			XXX	
		Phosphorus			XXX			XXX	
		Platinum			XXX			XXX	
		Potassium			XXX			XXX	
		Praesodymium			XXX			XXX	
		Rhenium			XXX			XXX	
		Rhodium			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE C - CEMENT CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Cement Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Rubidium			XXX			XXX	
		Ruthenium			XXX			XXX	
		Samarium			XXX			XXX	
		Scandium			XXX			XXX	
		Selenium			XXX			XXX	
		Silicon			XXX			XXX	
		Silver			XXX			XXX	
		Sodium			XXX			XXX	
		Strontium			XXX			XXX	
		Sulfur			XXX			XXX	
		Tantalum			XXX			XXX	
		Tellurium			XXX			XXX	
		Terbium			XXX			XXX	
		Thallium			XXX			XXX	
		Thorium			XXX			XXX	
		Thulium			XXX			XXX	
		Tin			XXX			XXX	
		Titanium			XXX			XXX	
		Tungsten			XXX			XXX	
		Uranium			XXX			XXX	
		Vanadium			XXX			XXX	
		Ytterbium			XXX			XXX	
		Yttrium			XXX			XXX	
		Zinc			XXX			XXX	
		Zirconium			XXX			XXX	
IM1	Chloride	Chloride			XXX		XXX		XXX
IM4	Sulphate	Sulphate			XXX		XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE D - CHEMICAL LIME CATEGORY

		EFFLUENT STREAM TYPE:	Lime Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
2	Total cyanide	Total cyanide			XXX	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX			XXX
4a	Nitrogen (but see subsection 9(4))	Ammonia plus Ammonium		XXX	XXX	XXX
		Total Kjeldahl nitrogen				
4b		Nitrate + Nitrite			XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX	
5b		Total organic carbon (TOC)				
6	Total phosphorus	Total phosphorus			XXX	
7	Specific conductance	Specific conductance			XXX	XXX
8	Suspended solids	Total suspended solids (TSS)	XXX			XXX
		Volatile suspended solids (VSS)				
9	Total metals (but see subsection 9(6))	Aluminum			XXX	
		Beryllium			XXX	
		Cadmium			XXX	
		Chromium			XXX	
		Cobalt			XXX	
		Copper		XXX	XXX	XXX
		Lead			XXX	
		Molybdenum			XXX	
		Nickel			XXX	
		Silver			XXX	
		Thallium			XXX	
		Vanadium			XXX	
		Zinc			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE D - CHEMICAL LIME CATEGORY

		EFFLUENT STREAM TYPE:	Lime Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)			XXX	
12	Mercury	Mercury			XXX	
14	Phenolics (4AAP) but see subsection 9(6))	Phenolics (4AAP)		XXX	XXX	XXX
15	Sulphide	Sulphide			XXX	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX	
		1,1,2-Trichloroethane			XXX	
		1,1-Dichloroethane			XXX	
		1,1-Dichloroethylene			XXX	
		1,2-Dichlorobenzene			XXX	
		1,2-Dichloroethane (Ethylene dichloride)			XXX	
		1,2-Dichloropropane			XXX	
		1,3-Dichlorobenzene			XXX	
		1,4-Dichlorobenzene			XXX	
		Bromoform			XXX	
		Bromomethane			XXX	
		Carbon tetrachloride			XXX	
		Chlorobenzene			XXX	
		Chloroform			XXX	
		Chloromethane			XXX	
		Cis-1,3-Dichloropropylene			XXX	
		Dibromochloromethane			XXX	
		Ethylene dibromide			XXX	
		Methylene chloride			XXX	
		Tetrachloroethylene (Perchloroethylene)			XXX	
		Trans-1,2-Dichloroethylene			XXX	
		Trans-1,3-Dichloropropylene			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE D - CHEMICAL LIME CATEGORY

		EFFLUENT STREAM TYPE:	Lime Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
16	Volatiles, Halogenated (continued)	Trichloroethylene			XXX	
		Trichlorofluoromethane			XXX	
		Vinyl chloride (Chloroethylene)			XXX	
17	Volatiles, Non-Halogenated	Benzene			XXX	
		Styrene			XXX	
		Toluene			XXX	
		o-Xylene			XXX	
		m-Xylene and p-Xylene			XXX	
19	Extractables, Base Neutral	Acenaphthene			XXX	
		5-nitro Acenaphthene			XXX	
		Acenaphthylene			XXX	
		Anthracene			XXX	
		Benz(a)anthracene			XXX	
		Benzo(a)pyrene			XXX	
		Benzo(b)fluoranthene			XXX	
		Benzo(g,h,i)perylene			XXX	
		Benzo(k)fluoranthene			XXX	
		Camphene			XXX	
		1-Chloronaphthalene			XXX	
		2-Chloronaphthalene			XXX	
		Chrysene			XXX	
		Dibenz(a,h)anthracene			XXX	
		Fluoranthene			XXX	
		Fluorene			XXX	
		Indeno(1,2,3-cd)pyrene			XXX	
		Indole			XXX	
		1-Methylnaphthalene			XXX	
		2-Methylnaphthalene			XXX	
		Naphthalene			XXX	
		Perylene			XXX	
		Phenanthrene			XXX	
		Pyrene			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE D - CHEMICAL LIME CATEGORY

		EFFLUENT STREAM TYPE:	Lime Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
19	Extractables, Base Neutral (continued)	Benzyl butyl phthalate			XXX	
		Bis(2-Ethylhexyl) phthalate			XXX	
		Di-n-butyl phthalate			XXX	
		4-Bromophenyl phenyl ether			XXX	
		4-Chlorophenyl phenyl ether			XXX	
		Bis(2-Chloroisopropyl)ether			XXX	
		Bis(2-Chloroethyl)ether			XXX	
		2,4-Dinitrotoluene			XXX	
		2,6-Dinitrotoluene			XXX	
		Bis(2-Chloroethoxy)methane			XXX	
		Diphenylamine			XXX	
		N-Nitrosodiphenylamine			XXX	
		N-Nitrosodi-n-propylamine			XXX	
20	Extractables, Acid (Phenolics) (but see subsection 9(6))	2,3,4,5-Tetrachlorophenol		XXX	XXX	
		2,3,4,6-Tetrachlorophenol		XXX	XXX	
		2,3,5,6-Tetrachlorophenol		XXX	XXX	
		2,3,4-Trichlorophenol		XXX	XXX	
		2,3,5-Trichlorophenol		XXX	XXX	
		2,4,5-Trichlorophenol		XXX	XXX	
		2,4,6-Trichlorophenol		XXX	XXX	
		2,4-Dimethyl phenol		XXX	XXX	
		2,4-Dinitrophenol		XXX	XXX	
		2,4-Dichlorophenol		XXX	XXX	
		2,6-Dichlorophenol		XXX	XXX	
		4,6-Dinitro-o-cresol		XXX	XXX	
		2-Chlorophenol		XXX	XXX	
		4-Chloro-3-methylphenol		XXX	XXX	
		4-Nitrophenol		XXX	XXX	
		m-Cresol		XXX	XXX	
		o-Cresol		XXX	XXX	
		p-Cresol		XXX	XXX	
		Pentachlorophenol		XXX	XXX	
		Phenol		XXX	XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE D - CHEMICAL LIME CATEGORY

		EFFLUENT STREAM TYPE:	Lime Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX	
		Octachlorodibenzo-p-dioxin			XXX	
		Octachlorodibenzofuran			XXX	
		Total heptachlorinated dibenzo-p-dioxins			XXX	
		Total heptachlorinated dibenzofurans			XXX	
		Total hexachlorinated dibenzo-p-dioxins			XXX	
		Total hexachlorinated dibenzofurans			XXX	
		Total pentachlorinated dibenzo-p-dioxins			XXX	
		Total pentachlorinated dibenzofurans			XXX	
		Total tetrachlorinated dibenzo-p-dioxins			XXX	
		Total tetrachlorinated dibenzofurans			XXX	
25	Solvent Extractables	Oil and grease	XXX			XXX
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)			XXX	
28a	Open Characterization - Volatiles				XXX	
28b	Open Characterization - Extractables				XXX	
29	Open Characterization - Elemental	Aluminum			XXX	
		Antimony			XXX	
		Arsenic			XXX	
		Barium			XXX	
		Beryllium			XXX	
		Bismuth			XXX	
		Boron			XXX	
		Cadmium			XXX	
		Calcium			XXX	
		Cerium			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE D - CHEMICAL LIME CATEGORY

		EFFLUENT STREAM TYPE:	Lime Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
29	Open Characterization - Elemental (continued)	Cesium			XXX	
		Chromium			XXX	
		Cobalt			XXX	
		Copper			XXX	
		Dysprosium			XXX	
		Erbium			XXX	
		Europium			XXX	
		Gadolinium			XXX	
		Gallium			XXX	
		Germanium			XXX	
		Gold			XXX	
		Hafnium			XXX	
		Holmium			XXX	
		Indium			XXX	
		Iridium			XXX	
		Iron			XXX	
		Lanthanum			XXX	
		Lead			XXX	
		Lithium			XXX	
		Lutetium			XXX	
		Magnesium			XXX	
		Manganese			XXX	
		Mercury			XXX	
		Molybdenum			XXX	
		Neodymium			XXX	
		Nickel			XXX	
		Niobium			XXX	
		Osmium			XXX	
		Palladium			XXX	
		Phosphorus			XXX	
		Platinum			XXX	
		Potassium			XXX	
		Praesodymium			XXX	
		Rhenium			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE D - CHEMICAL LIME CATEGORY

		EFFLUENT STREAM TYPE:	Lime Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
29	Open Characterization - Elemental (continued)	Rhodium			XXX	
		Rubidium			XXX	
		Ruthenium			XXX	
		Samarium			XXX	
		Scandium			XXX	
		Selenium			XXX	
		Silicon			XXX	
		Silver			XXX	
		Sodium			XXX	
		Strontium			XXX	
		Sulfur			XXX	
		Tantalum			XXX	
		Tellurium			XXX	
		Terbium			XXX	
		Thallium			XXX	
		Thorium			XXX	
		Thulium			XXX	
		Tin			XXX	
		Titanium			XXX	
		Tungsten			XXX	
		Uranium			XXX	
		Vanadium			XXX	
		Ytterbium			XXX	
		Yttrium			XXX	
		Zinc			XXX	
		Zirconium			XXX	
IM1	Chloride	Chloride			XXX	
IM4	Sulphate	Sulphate			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE E - CLAY AND SHALE CATEGORY

		EFFLUENT STREAM TYPE:	Storm Water	
		TOXICITY TESTS SAMPLING FREQUENCY:	SA	
		FREQUENCY OF SAMPLING:	M / at time of discharge (but see subsection 10(2))	SA
ANALYTICAL TEST GROUP		**PARAMETERS TO BE ANALYZED**		
2	Total cyanide	Total cyanide		XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX	
4a	Nitrogen	Ammonia plus Ammonium		XXX
		Total Kjeldahl nitrogen		
4b		Nitrate + Nitrite		XXX
5a	Organic carbon	Dissolved organic carbon (DOC)		XXX
5b		Total organic carbon (TOC)		
6	Total phosphorus	Total phosphorus		XXX
7	Specific conductance	Specific conductance	XXX	
8	Suspended solids	Total suspended solids (TSS)	XXX	
		Volatile suspended solids (VSS)		
9	Total metals	Aluminum		XXX
		Beryllium		XXX
		Cadmium		XXX
		Chromium		XXX
		Cobalt		XXX
		Copper		XXX
		Lead		XXX
		Molybdenum		XXX
		Nickel		XXX
		Silver		XXX
		Thallium		XXX
		Vanadium		XXX
		Zinc		XXX

		EFFLUENT STREAM TYPE:	Storm Water	
		TOXICITY TESTS SAMPLING FREQUENCY:	SA	
		FREQUENCY OF SAMPLING:	M / at time of discharge (but see subsection 10(2))	SA
ANALYTICAL TEST GROUP		**PARAMETERS TO BE ANALYZED**		
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)		XXX
12	Mercury	Mercury		XXX
14	Phenolics (4AAP)	Phenolics (4AAP)	XXX	
15	Sulphide	Sulphide		XXX
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane		XXX
		1,1,2-Trichloroethane		XXX
		1,1-Dichloroethane		XXX
		1,1-Dichloroethylene		XXX
		1,2-Dichlorobenzene		XXX
		1,2-Dichloroethane (Ethylene dichloride)		XXX
		1,2-Dichloropropane		XXX
		1,3-Dichlorobenzene		XXX
		1,4-Dichlorobenzene		XXX
		Bromoform		XXX
		Bromomethane		XXX
		Carbon tetrachloride		XXX
		Chlorobenzene		XXX
		Chloroform		XXX
		Chloromethane		XXX
		Cis-1,3-Dichloropropylene		XXX
		Dibromochloromethane		XXX
		Ethylene dibromide		XXX
		Methylene chloride		XXX
		Tetrachloroethylene (Perchloroethylene)		XXX
		Trans-1,2-Dichloroethylene		XXX
		Trans-1,3-Dichloropropylene		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE E - CLAY AND SHALE CATEGORY

		EFFLUENT STREAM TYPE:	Storm Water	
		TOXICITY TESTS SAMPLING FREQUENCY:	SA	
		FREQUENCY OF SAMPLING:	M / at time of discharge (but see subsection 10(2))	SA
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED		
16	Volatiles, Halogenated (continued)	Trichloroethylene		XXX
		Trichlorofluoromethane		XXX
		Vinyl chloride (Chloroethylene)		XXX
17	Volatiles, Non-Halogenated	Benzene		XXX
		Styrene		XXX
		Toluene		XXX
		o-Xylene		XXX
		m-Xylene and p-Xylene		XXX
19	Extractables, Base Neutral	Acenaphthene		XXX
		5-nitro Acenaphthene		XXX
		Acenaphthylene		XXX
		Anthracene		XXX
		Benz(a)anthracene		XXX
		Benzo(a)pyrene		XXX
		Benzo(b)fluoranthene		XXX
		Benzo(g,h,i)perylene		XXX
		Benzo(k)fluoranthene		XXX
		Camphene		XXX
		1-Chloronaphthalene		XXX
		2-Chloronaphthalene		XXX
		Chrysene		XXX
		Dibenz(a,h)anthracene		XXX
		Fluoranthene		XXX
		Fluorene		XXX
		Indeno(1,2,3-cd)pyrene		XXX
		Indole		XXX
		1-Methylnaphthalene		XXX
		2-Methylnaphthalene		XXX
		Naphthalene		XXX
		Perylene		XXX
		Phenanthrene		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE E - CLAY AND SHALE CATEGORY

		EFFLUENT STREAM TYPE:	Storm Water	
		TOXICITY TESTS SAMPLING FREQUENCY:	SA	
		FREQUENCY OF SAMPLING:	M / at time of discharge (but see subsection 10(2))	SA
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED		
19	Extractables, Base Neutral (continued)	Pyrene		XXX
		Benzyl butyl phthalate		XXX
		Bis(2-Ethylhexyl) phthalate		XXX
		Di-n-butyl phthalate		XXX
		4-Bromophenyl phenyl ether		XXX
		4-Chlorophenyl phenyl ether		XXX
		Bis(2-Chloroisopropyl)ether		XXX
		Bis(2-Chloroethyl)ether		XXX
		2,4-Dinitrotoluene		XXX
		2,6-Dinitrotoluene		XXX
		Bis(2-Chloroethoxy)methane		XXX
		Diphenylamine		XXX
		N-Nitrosodiphenylamine		XXX
		N-Nitrosodi-n-propylamine		XXX
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol		XXX
		2,3,4,6-Tetrachlorophenol		XXX
		2,3,5,6-Tetrachlorophenol		XXX
		2,3,4-Trichlorophenol		XXX
		2,3,5-Trichlorophenol		XXX
		2,4,5-Trichlorophenol		XXX
		2,4,6-Trichlorophenol		XXX
		2,4-Dimethyl phenol		XXX
		2,4-Dinitrophenol		XXX
		2,4-Dichlorophenol		XXX
		2,6-Dichlorophenol		XXX
		4,6-Dinitro-o-cresol		XXX
		2-Chlorophenol		XXX
		4-Chloro-3-methylphenol		XXX
		4-Nitrophenol		XXX
		m-Cresol		XXX
		o-Cresol		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE E - CLAY AND SHALE CATEGORY

		EFFLUENT STREAM TYPE:	Storm Water	
		TOXICITY TESTS SAMPLING FREQUENCY:	SA	
		FREQUENCY OF SAMPLING:	M / at time of discharge (but see subsection 10(2))	SA
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED		
20	Extractables, Acid (Phenolics) (continued)	p-Cresol		XXX
		Pentachlorophenol		XXX
		Phenol		XXX
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin		XXX
		Octachlorodibenzo-p-dioxin		XXX
		Octachlorodibenzofuran		XXX
		Total heptachlorinated dibenzo-p-dioxins		XXX
		Total heptachlorinated dibenzofurans		XXX
		Total hexachlorinated dibenzo-p-dioxins		XXX
		Total hexachlorinated dibenzofurans		XXX
		Total pentachlorinated dibenzo-p-dioxins		XXX
		Total pentachlorinated dibenzofurans		XXX
		Total tetrachlorinated dibenzo-p-dioxins		XXX
		Total tetrachlorinated dibenzofurans		XXX
25	Solvent Extractables	Oil and grease	XXX	
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)		XXX
28a	Open Characterization - Volatiles			XXX
28b	Open Characterization - Extractables			XXX
29	Open Characterization - Elemental	Aluminum		XXX
		Antimony		XXX
		Arsenic		XXX
		Barium		XXX
		Beryllium		XXX
		Bismuth		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE E - CLAY AND SHALE CATEGORY

		EFFLUENT STREAM TYPE:	Storm Water	
		TOXICITY TESTS SAMPLING FREQUENCY:	SA	
		FREQUENCY OF SAMPLING:	M / at time of discharge (but see subsection 10(2))	SA
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED		
29	Open Characterization - Elemental (continued)	Boron		XXX
		Cadmium		XXX
		Calcium		XXX
		Cerium		XXX
		Cesium		XXX
		Chromium		XXX
		Cobalt		XXX
		Copper		XXX
		Dysprosium		XXX
		Erbium		XXX
		Europium		XXX
		Gadolinium		XXX
		Gallium		XXX
		Germanium		XXX
		Gold		XXX
		Hafnium		XXX
		Holmium		XXX
		Indium		XXX
		Iridium		XXX
		Iron		XXX
		Lanthanum		XXX
		Lead		XXX
		Lithium		XXX
		Lutetium		XXX
		Magnesium		XXX
		Manganese		XXX
		Mercury		XXX
		Molybdenum		XXX
		Neodymium		XXX
		Nickel		XXX
		Niobium		XXX
		Osmium		XXX
		Palladium		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE E - CLAY AND SHALE CATEGORY

		EFFLUENT STREAM TYPE:	Storm Water	
		TOXICITY TESTS SAMPLING FREQUENCY:	SA	
		FREQUENCY OF SAMPLING:	M / at time of discharge (but see subsection 10(2))	SA
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED		
29	Open Characterization - Elemental (continued)	Phosphorus		XXX
		Platinum		XXX
		Potassium		XXX
		Praesodymium		XXX
		Rhenium		XXX
		Rhodium		XXX
		Rubidium		XXX
		Ruthenium		XXX
		Samarium		XXX
		Scandium		XXX
		Selenium		XXX
		Silicon		XXX
		Silver		XXX
		Sodium		XXX
		Strontium		XXX
		Sulfur		XXX
		Tantalum		XXX
		Tellurium		XXX
		Terbium		XXX
		Thallium		XXX
		Thorium		XXX
		Thulium		XXX
		Tin		XXX
		Titanium		XXX
		Tungsten		XXX
		Uranium		XXX
		Vanadium		XXX
		Ytterbium		XXX
		Yttrium		XXX
		Zinc		XXX
		Zirconium		XXX
IM3	Fluoride	Fluoride	XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE F - GRAPHITE CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Graphite Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
2	Total cyanide	Total cyanide			XXX			XXX	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX			XXX			XXX
4a	Nitrogen	Ammonia plus Ammonium		XXX				XXX	XXX
		Total Kjeldahl nitrogen							
4b		Nitrate + Nitrite			XXX			XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX	
5b		Total organic carbon (TOC)							
6	Total phosphorus	Total phosphorus			XXX			XXX	
7	Specific conductance	Specific conductance			XXX			XXX	
8	Suspended solids	Total suspended solids (TSS)	XXX			XXX			XXX
		Volatile suspended solids (VSS)							
9	Total metals	Aluminum			XXX				
		Beryllium			XXX				
		Cadmium		XXX			XXX		XXX
		Chromium			XXX				
		Cobalt			XXX				
		Copper		XXX			XXX		XXX
		Lead		XXX			XXX		XXX
		Molybdenum			XXX				
		Nickel		XXX			XXX		XXX
		Silver			XXX				
		Thallium			XXX				
		Vanadium			XXX				
		Zinc		XXX			XXX		XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE F - GRAPHITE CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Graphite Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
10	Hydrides	Antimony			XXX				
		Arsenic		XXX			XXX		XXX
		Selenium			XXX				
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)			XXX				
12	Mercury	Mercury		XXX			XXX		XXX
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX			XXX		XXX
15	Sulphide	Sulphide		XXX			XXX		XXX
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX	
		1,1,2-Trichloroethane			XXX			XXX	
		1,1-Dichloroethane			XXX			XXX	
		1,1-Dichloroethylene			XXX			XXX	
		1,2-Dichlorobenzene			XXX			XXX	
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX	
		1,2-Dichloropropane			XXX			XXX	
		1,3-Dichlorobenzene			XXX			XXX	
		1,4-Dichlorobenzene			XXX			XXX	
		Bromoform			XXX			XXX	
		Bromomethane			XXX			XXX	
		Carbon tetrachloride			XXX			XXX	
		Chlorobenzene			XXX			XXX	
		Chloroform			XXX			XXX	
		Chloromethane			XXX			XXX	
		Cis-1,3-Dichloropropylene			XXX			XXX	
		Dibromochloromethane			XXX			XXX	
		Ethylene dibromide			XXX			XXX	
		Methylene chloride			XXX			XXX	
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX	
		Trans-1,2-Dichloroethylene			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE F - GRAPHITE CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Graphite Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
16	Volatiles, Halogenated (continued)	Trans-1,3-Dichloropropylene			XXX			XXX	
		Trichloroethylene			XXX			XXX	
		Trichlorofluoromethane			XXX			XXX	
		Vinyl chloride (Chloroethylene)			XXX			XXX	
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX	
		Styrene			XXX			XXX	
		Toluene			XXX			XXX	
		o-Xylene			XXX			XXX	
		m-Xylene and p-Xylene			XXX			XXX	
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX	
		5-nitro Acenaphthene			XXX			XXX	
		Acenaphthylene			XXX			XXX	
		Anthracene			XXX			XXX	
		Benz(a)anthracene			XXX			XXX	
		Benzo(a)pyrene			XXX			XXX	
		Benzo(b)fluoranthene			XXX			XXX	
		Benzo(g,h,i)perylene			XXX			XXX	
		Benzo(k)fluoranthene			XXX			XXX	
		Camphene			XXX			XXX	
		1-Chloronaphthalene			XXX			XXX	
		2-Chloronaphthalene			XXX			XXX	
		Chrysene			XXX			XXX	
		Dibenz(a,h)anthracene			XXX			XXX	
		Fluoranthene			XXX			XXX	
		Fluorene			XXX			XXX	
		Indeno(1,2,3-cd)pyrene			XXX			XXX	
		Indole			XXX			XXX	
		1-Methylnaphthalene			XXX			XXX	
		2-Methylnaphthalene			XXX			XXX	
		Naphthalene			XXX			XXX	
		Perylene			XXX			XXX	
		Phenanthrene			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE F - GRAPHITE CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Graphite Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
19	Extractables, Base Neutral (continued)	Pyrene			XXX			XXX	
		Benzyl butyl phthalate			XXX			XXX	
		Bis(2-Ethylhexyl) phthalate			XXX			XXX	
		Di-n-butyl phthalate			XXX			XXX	
		4-Bromophenyl phenyl ether			XXX			XXX	
		4-Chlorophenyl phenyl ether			XXX			XXX	
		Bis(2-Chloroisopropyl)ether			XXX			XXX	
		Bis(2-Chloroethyl)ether			XXX			XXX	
		2,4-Dinitrotoluene			XXX			XXX	
		2,6-Dinitrotoluene			XXX			XXX	
		Bis(2-Chloroethoxy)methane			XXX			XXX	
		Diphenylamine			XXX			XXX	
		N-Nitrosodiphenylamine			XXX			XXX	
		N-Nitrosodi-n-propylamine			XXX			XXX	
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX	
		2,3,4,6-Tetrachlorophenol			XXX			XXX	
		2,3,5,6-Tetrachlorophenol			XXX			XXX	
		2,3,4-Trichlorophenol			XXX			XXX	
		2,3,5-Trichlorophenol			XXX			XXX	
		2,4,5-Trichlorophenol			XXX			XXX	
		2,4,6-Trichlorophenol			XXX			XXX	
		2,4-Dimethyl phenol			XXX			XXX	
		2,4-Dinitrophenol			XXX			XXX	
		2,4-Dichlorophenol			XXX			XXX	
		2,6-Dichlorophenol			XXX			XXX	
		4,6-Dinitro-o-cresol			XXX			XXX	
		2-Chlorophenol			XXX			XXX	
		4-Chloro-3-methylphenol			XXX			XXX	
		4-Nitrophenol			XXX			XXX	
		m-Cresol			XXX			XXX	
		o-Cresol			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE F - GRAPHITE CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Graphite Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
20	Extractables, Acid (Phenolics) (continued)	p-Cresol			XXX			XXX	
		Pentachlorophenol			XXX			XXX	
		Phenol			XXX			XXX	
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzofuran			XXX			XXX	
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total heptachlorinated dibenzofurans			XXX			XXX	
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total hexachlorinated dibenzofurans			XXX			XXX	
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total pentachlorinated dibenzofurans			XXX			XXX	
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total tetrachlorinated dibenzofurans			XXX			XXX	
25	Solvent Extractables	Oil and grease	XXX			XXX			XXX
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)			XXX			XXX	
28a	Open Characterization - Volatiles				XXX			XXX	
28b	Open Characterization - Extractables				XXX			XXX	
29	Open Characterization - Elemental	Aluminum			XXX			XXX	
		Antimony			XXX			XXX	
		Arsenic			XXX			XXX	
		Barium			XXX			XXX	
		Beryllium			XXX			XXX	
		Bismuth			XXX			XXX	
		Boron			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE F - GRAPHITE CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Graphite Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Cadmium			XXX			XXX	
		Calcium			XXX			XXX	
		Cerium			XXX			XXX	
		Cesium			XXX			XXX	
		Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Dysprosium			XXX			XXX	
		Erbium			XXX			XXX	
		Europium			XXX			XXX	
		Gadolinium			XXX			XXX	
		Gallium			XXX			XXX	
		Germanium			XXX			XXX	
		Gold			XXX			XXX	
		Hafnium			XXX			XXX	
		Holmium			XXX			XXX	
		Indium			XXX			XXX	
		Iridium			XXX			XXX	
		Iron			XXX			XXX	
		Lanthanum			XXX			XXX	
		Lead			XXX			XXX	
		Lithium			XXX			XXX	
		Lutetium			XXX			XXX	
		Magnesium			XXX			XXX	
		Manganese			XXX			XXX	
		Mercury			XXX			XXX	
		Molybdenum			XXX			XXX	
		Neodymium			XXX			XXX	
		Nickel			XXX			XXX	
		Niobium			XXX			XXX	
		Osmium			XXX			XXX	
		Palladium			XXX			XXX	
		Phosphorus			XXX			XXX	
		Platinum			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE F - GRAPHITE CATEGORY

EFFLUENT STREAM TYPE:			Quarry Water			Graphite Plant			Storm Water
TOXICITY TESTS SAMPLING FREQUENCY:			SA			SA			None
FREQUENCY OF SAMPLING:			3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Potassium			XXX			XXX	
		Praesodymium			XXX			XXX	
		Rhenium			XXX			XXX	
		Rhodium			XXX			XXX	
		Rubidium			XXX			XXX	
		Ruthenium			XXX			XXX	
		Samarium			XXX			XXX	
		Scandium			XXX			XXX	
		Selenium			XXX			XXX	
		Silicon			XXX			XXX	
		Silver			XXX			XXX	
		Sodium			XXX			XXX	
		Strontium			XXX			XXX	
		Sulfur			XXX			XXX	
		Tantalum			XXX			XXX	
		Tellurium			XXX			XXX	
		Terbium			XXX			XXX	
		Thallium			XXX			XXX	
		Thorium			XXX			XXX	
		Thulium			XXX			XXX	
		Tin			XXX			XXX	
		Titanium			XXX			XXX	
		Tungsten			XXX			XXX	
		Uranium			XXX			XXX	
		Vanadium			XXX			XXX	
		Ytterbium			XXX			XXX	
		Yttrium			XXX			XXX	
		Zinc			XXX			XXX	
		Zirconium			XXX			XXX	
IM4	Sulphate	Sulphate			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE G - GYPSUM CATEGORY

		EFFLUENT STREAM TYPE:	Minewater			Gypsum Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX			XXX			XXX
4a	Nitrogen	Ammonia plus Ammonium		XXX				XXX	XXX
		Total Kjeldahl nitrogen							
4b		Nitrate + Nitrite			XXX			XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX	
5b		Total organic carbon (TOC)							
6	Total phosphorus	Total phosphorus			XXX			XXX	
7	Specific conductance	Specific conductance			XXX			XXX	XXX
8	Suspended solids	Total suspended solids (TSS)	XXX			XXX			XXX
		Volatile suspended solids (VSS)							
9	Total metals	Aluminum			XXX			XXX	
		Beryllium			XXX			XXX	
		Cadmium			XXX			XXX	
		Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Lead			XXX			XXX	
		Molybdenum			XXX			XXX	
		Nickel			XXX			XXX	
		Silver			XXX			XXX	
		Thallium			XXX			XXX	
		Vanadium			XXX			XXX	
		Zinc			XXX			XXX	
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE G - GYPSUM CATEGORY

		EFFLUENT STREAM TYPE:	Minewater			Gypsum Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
12	Mercury	Mercury			XXX			XXX	
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX			XXX		XXX
15	Sulphide	Sulphide			XXX			XXX	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX	
		1,1,2-Trichloroethane			XXX			XXX	
		1,1-Dichloroethane			XXX			XXX	
		1,1-Dichloroethylene			XXX			XXX	
		1,2-Dichlorobenzene			XXX			XXX	
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX	
		1,2-Dichloropropane			XXX			XXX	
		1,3-Dichlorobenzene			XXX			XXX	
		1,4-Dichlorobenzene			XXX			XXX	
		Bromoform			XXX			XXX	
		Bromomethane			XXX			XXX	
		Carbon tetrachloride			XXX			XXX	
		Chlorobenzene			XXX			XXX	
		Chloroform			XXX			XXX	
		Chloromethane			XXX			XXX	
		Cis-1,3-Dichloropropylene			XXX			XXX	
		Dibromochloromethane			XXX			XXX	
		Ethylene dibromide			XXX			XXX	
		Methylene chloride			XXX			XXX	
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX	
		Trans-1,2-Dichloroethylene			XXX			XXX	
		Trans-1,3-Dichloropropylene			XXX			XXX	
		Trichloroethylene			XXX			XXX	
		Trichlorofluoromethane			XXX			XXX	
		Vinyl chloride (Chloroethylene)			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE G - GYPSUM CATEGORY

		EFFLUENT STREAM TYPE:	Minewater			Gypsum Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX	
		Styrene			XXX			XXX	
		Toluene			XXX			XXX	
		o-Xylene			XXX			XXX	
		m-Xylene and p-Xylene			XXX			XXX	
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX	
		5-nitro Acenaphthene			XXX			XXX	
		Acenaphthylene			XXX			XXX	
		Anthracene			XXX			XXX	
		Benz(a)anthracene			XXX			XXX	
		Benzo(a)pyrene			XXX			XXX	
		Benzo(b)fluoranthene			XXX			XXX	
		Benzo(g,h,i)perylene			XXX			XXX	
		Benzo(k)fluoranthene			XXX			XXX	
		Camphene			XXX			XXX	
		1-Chloronaphthalene			XXX			XXX	
		2-Chloronaphthalene			XXX			XXX	
		Chrysene			XXX			XXX	
		Dibenz(a,h)anthracene			XXX			XXX	
		Fluoranthene			XXX			XXX	
		Fluorene			XXX			XXX	
		Indeno(1,2,3-cd)pyrene			XXX			XXX	
		Indole			XXX			XXX	
		1-Methylnaphthalene			XXX			XXX	
		2-Methylnaphthalene			XXX			XXX	
		Naphthalene			XXX			XXX	
		Perylene			XXX			XXX	
		Phenanthrene			XXX			XXX	
		Pyrene			XXX			XXX	
		Benzyl butyl phthalate			XXX			XXX	
		Bis(2-Ethylhexyl) phthalate			XXX			XXX	
		Di-n-butyl phthalate			XXX			XXX	
		4-Bromophenyl phenyl ether			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE G - GYPSUM CATEGORY

		EFFLUENT STREAM TYPE:	Minewater			Gypsum Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
19	Extractables, Base Neutral (continued)	4-Chlorophenyl phenyl ether			XXX			XXX	
		Bis(2-Chloroisopropyl)ether			XXX			XXX	
		Bis(2-Chloroethyl)ether			XXX			XXX	
		2,4-Dinitrotoluene			XXX			XXX	
		2,6-Dinitrotoluene			XXX			XXX	
		Bis(2-Chloroethoxy)methane			XXX			XXX	
		Diphenylamine			XXX			XXX	
		N-Nitrosodiphenylamine			XXX			XXX	
		N-Nitrosodi-n-propylamine			XXX			XXX	
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX	
		2,3,4,6-Tetrachlorophenol			XXX			XXX	
		2,3,5,6-Tetrachlorophenol			XXX			XXX	
		2,3,4-Trichlorophenol			XXX			XXX	
		2,3,5-Trichlorophenol			XXX			XXX	
		2,4,5-Trichlorophenol			XXX			XXX	
		2,4,6-Trichlorophenol			XXX			XXX	
		2,4-Dimethyl phenol			XXX			XXX	
		2,4-Dinitrophenol			XXX			XXX	
		2,4-Dichlorophenol			XXX			XXX	
		2,6-Dichlorophenol			XXX			XXX	
		4,6-Dinitro-o-cresol			XXX			XXX	
		2-Chlorophenol			XXX			XXX	
		4-Chloro-3-methylphenol			XXX			XXX	
		4-Nitrophenol			XXX			XXX	
		m-Cresol			XXX			XXX	
		o-Cresol			XXX			XXX	
		p-Cresol			XXX			XXX	
		Pentachlorophenol			XXX			XXX	
		Phenol			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE G - GYPSUM CATEGORY

		EFFLUENT STREAM TYPE:	Minewater			Gypsum Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzofuran			XXX			XXX	
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total heptachlorinated dibenzofurans			XXX			XXX	
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total hexachlorinated dibenzofurans			XXX			XXX	
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total pentachlorinated dibenzofurans			XXX			XXX	
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total tetrachlorinated dibenzofurans			XXX			XXX	
25	Solvent Extractables	Oil and grease	XXX			XXX			XXX
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)			XXX			XXX	
28a	Open Characterization - Volatiles				XXX			XXX	
28b	Open Characterization - Extractables				XXX			XXX	
29	Open Characterization - Elemental	Aluminum			XXX			XXX	
		Antimony			XXX			XXX	
		Arsenic			XXX			XXX	
		Barium			XXX			XXX	
		Beryllium			XXX			XXX	
		Bismuth			XXX			XXX	
		Boron			XXX			XXX	
		Cadmium			XXX			XXX	
		Calcium			XXX			XXX	
		Cerium			XXX			XXX	
		Cesium			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE G - GYPSUM CATEGORY

		EFFLUENT STREAM TYPE:	Minewater			Gypsum Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Dysprosium			XXX			XXX	
		Erbium			XXX			XXX	
		Europium			XXX			XXX	
		Gadolinium			XXX			XXX	
		Gallium			XXX			XXX	
		Germanium			XXX			XXX	
		Gold			XXX			XXX	
		Hafnium			XXX			XXX	
		Holmium			XXX			XXX	
		Indium			XXX			XXX	
		Iridium			XXX			XXX	
		Iron			XXX			XXX	
		Lanthanum			XXX			XXX	
		Lead			XXX			XXX	
		Lithium			XXX			XXX	
		Lutetium			XXX			XXX	
		Magnesium			XXX			XXX	
		Manganese			XXX			XXX	
		Mercury			XXX			XXX	
		Molybdenum			XXX			XXX	
		Neodymium			XXX			XXX	
		Nickel			XXX			XXX	
		Niobium			XXX			XXX	
		Osmium			XXX			XXX	
		Palladium			XXX			XXX	
		Phosphorus			XXX			XXX	
		Platinum			XXX			XXX	
		Potassium			XXX			XXX	
		Praesodymium			XXX			XXX	
		Rhenium			XXX			XXX	
		Rhodium			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE G - GYPSUM CATEGORY

		EFFLUENT STREAM TYPE:	Minewater			Gypsum Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Rubidium			XXX			XXX	
		Ruthenium			XXX			XXX	
		Samarium			XXX			XXX	
		Scandium			XXX			XXX	
		Selenium			XXX			XXX	
		Silicon			XXX			XXX	
		Silver			XXX			XXX	
		Sodium			XXX			XXX	
		Strontium			XXX			XXX	
		Sulfur			XXX			XXX	
		Tantalum			XXX			XXX	
		Tellurium			XXX			XXX	
		Terbium			XXX			XXX	
		Thallium			XXX			XXX	
		Thorium			XXX			XXX	
		Thulium			XXX			XXX	
		Tin			XXX			XXX	
		Titanium			XXX			XXX	
		Tungsten			XXX			XXX	
		Uranium			XXX			XXX	
		Vanadium			XXX			XXX	
		Ytterbium			XXX			XXX	
		Yttrium			XXX			XXX	
		Zinc			XXX			XXX	
		Zirconium			XXX			XXX	
IM1	Chloride	Chloride			XXX			XXX	
IM4	Sulphate	Sulphate			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE H - MAGNESIUM CATEGORY

		EFFLUENT STREAM TYPE:	Magnesium Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
2	Total cyanide	Total cyanide			XXX	XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX			XXX
4a	Nitrogen	Ammonia plus Ammonium		XXX		XXX
		Total Kjeldahl nitrogen				
4b		Nitrate + Nitrite				
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX	
5b		Total organic carbon (TOC)				
6	Total phosphorus	Total phosphorus			XXX	
7	Specific conductance	Specific conductance			XXX	
8	Suspended solids	Total suspended solids (TSS)	XXX			XXX
		Volatile suspended solids (VSS)				
9	Total metals	Aluminum			XXX	
		Beryllium			XXX	
		Cadmium			XXX	
		Chromium			XXX	
		Cobalt			XXX	
		Copper			XXX	
		Lead			XXX	
		Molybdenum			XXX	
		Nickel			XXX	
		Silver			XXX	
		Thallium			XXX	
		Vanadium			XXX	
		Zinc			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE H - MAGNESIUM CATEGORY

		EFFLUENT STREAM TYPE:	Magnesium Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)			XXX	
12	Mercury	Mercury			XXX	
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX		XXX
15	Sulphide	Sulphide			XXX	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX	
		1,1,2-Trichloroethane			XXX	
		1,1-Dichloroethane			XXX	
		1,1-Dichloroethylene			XXX	
		1,2-Dichlorobenzene			XXX	
		1,2-Dichloroethane (Ethylene dichloride)			XXX	
		1,2-Dichloropropane			XXX	
		1,3-Dichlorobenzene			XXX	
		1,4-Dichlorobenzene			XXX	
		Bromoform			XXX	
		Bromomethane			XXX	
		Carbon tetrachloride			XXX	
		Chlorobenzene			XXX	
		Chloroform			XXX	
		Chloromethane			XXX	
		Cis-1,3-Dichloropropylene			XXX	
		Dibromochloromethane			XXX	
		Ethylene dibromide			XXX	
		Methylene chloride			XXX	
		Tetrachloroethylene (Perchloroethylene)			XXX	
		Trans-1,2-Dichloroethylene			XXX	
		Trans-1,3-Dichloropropylene			XXX	
		Trichloroethylene			XXX	
		Trichlorofluoromethane			XXX	
		Vinyl chloride (Chloroethylene)			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE H - MAGNESIUM CATEGORY

		EFFLUENT STREAM TYPE:	Magnesium Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
17	Volatiles, Non-Halogenated	Benzene			XXX	
		Styrene			XXX	
		Toluene			XXX	
		o-Xylene			XXX	
		m-Xylene and p-Xylene			XXX	
19	Extractables, Base Neutral	Acenaphthene			XXX	
		5-nitro Acenaphthene			XXX	
		Acenaphthylene			XXX	
		Anthracene			XXX	
		Benz(a)anthracene			XXX	
		Benzo(a)pyrene			XXX	
		Benzo(b)fluoranthene			XXX	
		Benzo(g,h,i)perylene			XXX	
		Benzo(k)fluoranthene			XXX	
		Camphene			XXX	
		1-Chloronaphthalene			XXX	
		2-Chloronaphthalene			XXX	
		Chrysene			XXX	
		Dibenz(a,h)anthracene			XXX	
		Fluoranthene			XXX	
		Fluorene			XXX	
		Indeno(1,2,3-cd)pyrene			XXX	
		Indole			XXX	
		1-Methylnaphthalene			XXX	
		2-Methylnaphthalene			XXX	
		Naphthalene			XXX	
		Perylene			XXX	
		Phenanthrene			XXX	
		Pyrene			XXX	
		Benzyl butyl phthalate			XXX	
		Bis(2-Ethylhexyl) phthalate			XXX	
		Di-n-butyl phthalate			XXX	
		4-Bromophenyl phenyl ether			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE H - MAGNESIUM CATEGORY

		EFFLUENT STREAM TYPE:	Magnesium Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
19	Extractables, Base Neutral (continued)	4-Chlorophenyl phenyl ether			XXX	
		Bis(2-Chloroisopropyl)ether			XXX	
		Bis(2-Chloroethyl)ether			XXX	
		2,4-Dinitrotoluene			XXX	
		2,6-Dinitrotoluene			XXX	
		Bis(2-Chloroethoxy)methane			XXX	
		Diphenylamine			XXX	
		N-Nitrosodiphenylamine			XXX	
		N-Nitrosodi-n-propylamine			XXX	
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX	
		2,3,4,6-Tetrachlorophenol			XXX	
		2,3,5,6-Tetrachlorophenol			XXX	
		2,3,4-Trichlorophenol			XXX	
		2,3,5-Trichlorophenol			XXX	
		2,4,5-Trichlorophenol			XXX	
		2,4,6-Trichlorophenol			XXX	
		2,4-Dimethyl phenol			XXX	
		2,4-Dinitrophenol			XXX	
		2,4-Dichlorophenol			XXX	
		2,6-Dichlorophenol			XXX	
		4,6-Dinitro-o-cresol			XXX	
		2-Chlorophenol			XXX	
		4-Chloro-3-methylphenol			XXX	
		4-Nitrophenol			XXX	
		m-Cresol			XXX	
		o-Cresol			XXX	
		p-Cresol			XXX	
		Pentachlorophenol			XXX	
		Phenol			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE H - MAGNESIUM CATEGORY

		EFFLUENT STREAM TYPE:	Magnesium Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX	
		Octachlorodibenzo-p-dioxin			XXX	
		Octachlorodibenzofuran			XXX	
		Total heptachlorinated dibenzo-p-dioxins			XXX	
		Total heptachlorinated dibenzofurans			XXX	
		Total hexachlorinated dibenzo-p-dioxins			XXX	
		Total hexachlorinated dibenzofurans			XXX	
		Total pentachlorinated dibenzo-p-dioxins			XXX	
		Total pentachlorinated dibenzofurans			XXX	
		Total tetrachlorinated dibenzo-p-dioxins			XXX	
		Total tetrachlorinated dibenzofurans			XXX	
25	Solvent Extractables	Oil and grease	XXX			XXX
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)			XXX	
28a	Open Characterization - Volatiles				XXX	
28b	Open Characterization - Extractables				XXX	
29	Open Characterization - Elemental	Aluminum			XXX	
		Antimony			XXX	
		Arsenic			XXX	
		Barium			XXX	
		Beryllium			XXX	
		Bismuth			XXX	
		Boron			XXX	
		Cadmium			XXX	
		Calcium			XXX	
		Cerium			XXX	
		Cesium			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE H - MAGNESIUM CATEGORY

		EFFLUENT STREAM TYPE:	Magnesium Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
29	Open Characterization - Elemental (continued)	Chromium			XXX	
		Cobalt			XXX	
		Copper			XXX	
		Dysprosium			XXX	
		Erbium			XXX	
		Europium			XXX	
		Gadolinium			XXX	
		Gallium			XXX	
		Germanium			XXX	
		Gold			XXX	
		Hafnium			XXX	
		Holmium			XXX	
		Indium			XXX	
		Iridium			XXX	
		Iron			XXX	
		Lanthanum			XXX	
		Lead			XXX	
		Lithium			XXX	
		Lutetium			XXX	
		Magnesium			XXX	
		Manganese			XXX	
		Mercury			XXX	
		Molybdenum			XXX	
		Neodymium			XXX	
		Nickel			XXX	
		Niobium			XXX	
		Osmium			XXX	
		Palladium			XXX	
		Phosphorus			XXX	
		Platinum			XXX	
		Potassium			XXX	
		Praesodymium			XXX	
		Rhenium			XXX	
		Rhodium			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE H - MAGNESIUM CATEGORY

		EFFLUENT STREAM TYPE:	Magnesium Plant			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED				
29	Open Characterization - Elemental (continued)	Rubidium			XXX	
		Ruthenium			XXX	
		Samarium			XXX	
		Scandium			XXX	
		Selenium			XXX	
		Silicon			XXX	
		Silver			XXX	
		Sodium			XXX	
		Strontium			XXX	
		Sulfur			XXX	
		Tantalum			XXX	
		Tellurium			XXX	
		Terbium			XXX	
		Thallium			XXX	
		Thorium			XXX	
		Thulium			XXX	
		Tin			XXX	
		Titanium			XXX	
		Tungsten			XXX	
		Uranium			XXX	
		Vanadium			XXX	
		Ytterbium			XXX	
		Yttrium			XXX	
		Zinc			XXX	
		Zirconium			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE I - QUARRIES CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Wash Water			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	A			A (but see subsection 12(6))			None
		FREQUENCY OF SAMPLING: (but see subsections 5(6) and 6(6))	3W	M	A	3W	M	A	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
2	Total cyanide	Total cyanide			XXX			XXX	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX			XXX			XXX
4a	Nitrogen	Ammonia plus Ammonium		XXX				XXX	XXX
		Total Kjeldahl nitrogen							
4b		Nitrate + Nitrite			XXX			XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX	
5b		Total organic carbon (TOC)							
6	Total phosphorus	Total phosphorus			XXX			XXX	
7	Specific conductance	Specific conductance			XXX			XXX	XXX
8	Suspended solids	Total suspended solids (TSS)	XXX			XXX			XXX
		Volatile suspended solids (VSS)							
9	Total metals	Aluminum			XXX			XXX	
		Beryllium			XXX			XXX	
		Cadmium			XXX			XXX	
		Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Lead			XXX			XXX	
		Molybdenum			XXX			XXX	
		Nickel			XXX			XXX	
		Silver			XXX			XXX	
		Thallium			XXX			XXX	
		Vanadium			XXX			XXX	
		Zinc			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE I - QUARRIES CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Wash Water			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	A			A (but see subsection 12(6))			None
		FREQUENCY OF SAMPLING: (but see subsections 5(6) and 6(6))	3W	M	A	3W	M	A	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)			XXX			XXX	
12	Mercury	Mercury			XXX			XXX	
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX			XXX		XXX
15	Sulphide	Sulphide			XXX			XXX	
16	Volatiles, Halogenated (but see subsection 9(8))	1,1,2,2-Tetrachloroethane		XXX	XXX			XXX	
		1,1,2-Trichloroethane		XXX	XXX			XXX	
		1,1-Dichloroethane		XXX	XXX			XXX	
		1,1-Dichloroethylene		XXX	XXX			XXX	
		1,2-Dichlorobenzene		XXX	XXX			XXX	
		1,2-Dichloroethane (Ethylene dichloride)		XXX	XXX			XXX	
		1,2-Dichloropropane		XXX	XXX			XXX	
		1,3-Dichlorobenzene		XXX	XXX			XXX	
		1,4-Dichlorobenzene		XXX	XXX			XXX	
		Bromoform		XXX	XXX			XXX	
		Bromomethane		XXX	XXX			XXX	
		Carbon tetrachloride		XXX	XXX			XXX	
		Chlorobenzene		XXX	XXX			XXX	
		Chloroform		XXX	XXX			XXX	
		Chloromethane		XXX	XXX			XXX	
		Cis-1,3-Dichloropropylene		XXX	XXX			XXX	
		Dibromochloromethane		XXX	XXX			XXX	
		Ethylene dibromide		XXX	XXX			XXX	
		Methylene chloride		XXX	XXX			XXX	
		Tetrachloroethylene (Perchloroethylene)		XXX	XXX			XXX	
		Trans-1,2-Dichloroethylene		XXX	XXX			XXX	
		Trans-1,3-Dichloropropylene		XXX	XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE I - QUARRIES CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Wash Water			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	A			A (but see subsection 12(6))			None
		FREQUENCY OF SAMPLING: (but see subsections 5(6) and 6(6))	3W	M	A	3W	M	A	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
16	Volatiles, Halogenated (but see subsection 9(8))	Trichloroethylene		XXX	XXX			XXX	
		Trichlorofluoromethane		XXX	XXX			XXX	
		Vinyl chloride (Chloroethylene)		XXX	XXX			XXX	
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX	
		Styrene			XXX			XXX	
		Toluene			XXX			XXX	
		o-Xylene			XXX			XXX	
		m-Xylene and p-Xylene			XXX			XXX	
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX	
		5-nitro Acenaphthene			XXX			XXX	
		Acenaphthylene			XXX			XXX	
		Anthracene			XXX			XXX	
		Benz(a)anthracene			XXX			XXX	
		Benzo(a)pyrene			XXX			XXX	
		Benzo(b)fluoranthene			XXX			XXX	
		Benzo(g,h,i)perylene			XXX			XXX	
		Benzo(k)fluoranthene			XXX			XXX	
		Camphene			XXX			XXX	
		1-Chloronaphthalene			XXX			XXX	
		2-Chloronaphthalene			XXX			XXX	
		Chrysene			XXX			XXX	
		Dibenz(a,h)anthracene			XXX			XXX	
		Fluoranthene			XXX			XXX	
		Fluorene			XXX			XXX	
		Indeno(1,2,3-cd)pyrene			XXX			XXX	
		Indole			XXX			XXX	
		1-Methylnaphthalene			XXX			XXX	
		2-Methylnaphthalene			XXX			XXX	
		Naphthalene			XXX			XXX	
		Perylene			XXX			XXX	
		Phenanthrene			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE I - QUARRIES CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Wash Water			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	A			A (but see subsection 12(6))			None
		FREQUENCY OF SAMPLING: (but see subsections 5(6) and 6(6))	3W	M	A	3W	M	A	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
19	Extractables, Base Neutral (continued)	Pyrene			XXX			XXX	
		Benzyl butyl phthalate			XXX			XXX	
		Bis(2-Ethylhexyl) phthalate			XXX			XXX	
		Di-n-butyl phthalate			XXX			XXX	
		4-Bromophenyl phenyl ether			XXX			XXX	
		4-Chlorophenyl phenyl ether			XXX			XXX	
		Bis(2-Chloroisopropyl)ether			XXX			XXX	
		Bis(2-Chloroethyl)ether			XXX			XXX	
		2,4-Dinitrotoluene			XXX			XXX	
		2,6-Dinitrotoluene			XXX			XXX	
		Bis(2-Chloroethoxy)methane			XXX			XXX	
		Diphenylamine			XXX			XXX	
		N-Nitrosodiphenylamine			XXX			XXX	
		N-Nitrosodi-n-propylamine			XXX			XXX	
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX	
		2,3,4,6-Tetrachlorophenol			XXX			XXX	
		2,3,5,6-Tetrachlorophenol			XXX			XXX	
		2,3,4-Trichlorophenol			XXX			XXX	
		2,3,5-Trichlorophenol			XXX			XXX	
		2,4,5-Trichlorophenol			XXX			XXX	
		2,4,6-Trichlorophenol			XXX			XXX	
		2,4-Dimethyl phenol			XXX			XXX	
		2,4-Dinitrophenol			XXX			XXX	
		2,4-Dichlorophenol			XXX			XXX	
		2,6-Dichlorophenol			XXX			XXX	
		4,6-Dinitro-o-cresol			XXX			XXX	
		2-Chlorophenol			XXX			XXX	
		4-Chloro-3-methylphenol			XXX			XXX	
		4-Nitrophenol			XXX			XXX	
		m-Cresol			XXX			XXX	
		o-Cresol			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE I - QUARRIES CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Wash Water			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	A			A (but see subsection 12(6))			None
		FREQUENCY OF SAMPLING: (but see subsections 5(6) and 6(6))	3W	M	A	3W	M	A	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
20	Extractables, Acid (Phenolics)	p-Cresol			XXX			XXX	
		Pentachlorophenol			XXX			XXX	
		Phenol			XXX			XXX	
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzofuran			XXX			XXX	
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total heptachlorinated dibenzofurans			XXX			XXX	
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total hexachlorinated dibenzofurans			XXX			XXX	
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total pentachlorinated dibenzofurans			XXX			XXX	
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total tetrachlorinated dibenzofurans			XXX			XXX	
25	Solvent Extractables	Oil and grease	XXX			XXX			XXX
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)			XXX			XXX	
28a	Open Characterization - Volatiles				XXX			XXX	
28b	Open Characterization - Extractables				XXX			XXX	
29	Open Characterization - Elemental	Aluminum			XXX			XXX	
		Antimony			XXX			XXX	
		Arsenic			XXX			XXX	
		Barium			XXX			XXX	
		Beryllium			XXX			XXX	
		Bismuth			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE I - QUARRIES CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Wash Water			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	A			A (but see subsection 12(6))			None
		FREQUENCY OF SAMPLING: (but see subsections 5(6) and 6(6))	3W	M	A	3W	M	A	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Boron			XXX			XXX	
		Cadmium			XXX			XXX	
		Calcium			XXX			XXX	
		Cerium			XXX			XXX	
		Cesium			XXX			XXX	
		Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Dysprosium			XXX			XXX	
		Erbium			XXX			XXX	
		Europium			XXX			XXX	
		Gadolinium			XXX			XXX	
		Gallium			XXX			XXX	
		Germanium			XXX			XXX	
		Gold			XXX			XXX	
		Hafnium			XXX			XXX	
		Holmium			XXX			XXX	
		Indium			XXX			XXX	
		Iridium			XXX			XXX	
		Iron			XXX			XXX	
		Lanthanum			XXX			XXX	
		Lead			XXX			XXX	
		Lithium			XXX			XXX	
		Lutetium			XXX			XXX	
		Magnesium			XXX			XXX	
		Manganese			XXX			XXX	
		Mercury			XXX			XXX	
		Molybdenum			XXX			XXX	
		Neodymium			XXX			XXX	
		Nickel			XXX			XXX	
		Niobium			XXX			XXX	
		Osmium			XXX			XXX	
		Palladium			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE I - QUARRIES CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Wash Water			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	A			A (but see subsection 12(6))			None
		FREQUENCY OF SAMPLING: (but see subsections 5(6) and 6(6))	3W	M	A	3W	M	A	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Phosphorus			XXX			XXX	
		Platinum			XXX			XXX	
		Potassium			XXX			XXX	
		Praesodymium			XXX			XXX	
		Rhenium			XXX			XXX	
		Rhodium			XXX			XXX	
		Rubidium			XXX			XXX	
		Ruthenium			XXX			XXX	
		Samarium			XXX			XXX	
		Scandium			XXX			XXX	
		Selenium			XXX			XXX	
		Silicon			XXX			XXX	
		Silver			XXX			XXX	
		Sodium			XXX			XXX	
		Strontium			XXX			XXX	
		Sulfur			XXX			XXX	
		Tantalum			XXX			XXX	
		Tellurium			XXX			XXX	
		Terbium			XXX			XXX	
		Thallium			XXX			XXX	
		Thorium			XXX			XXX	
		Thulium			XXX			XXX	
		Tin			XXX			XXX	
		Titanium			XXX			XXX	
		Tungsten			XXX			XXX	
		Uranium			XXX			XXX	
		Vanadium			XXX			XXX	
		Ytterbium			XXX			XXX	
		Yttrium			XXX			XXX	
		Zinc			XXX			XXX	
		Zirconium			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE I - QUARRIES CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Wash Water			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	A			A (but see subsection 12(6))			None
		FREQUENCY OF SAMPLING: (but see subsections 5(6) and 6(6))	3W	M	A	3W	M	A	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
IM1	Chloride	Chloride			XXX			XXX	
IM4	Sulphate	Sulphate			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE J - SAND AND GRAVEL CATEGORY

		EFFLUENT STREAM TYPE:	Wash Water		
		TOXICITY TESTS SAMPLING FREQUENCY:	A		
		FREQUENCY OF SAMPLING: (but see subsection 5(6))	3W	M	A
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED			
2	Total cyanide	Total cyanide			XXX
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX		
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX
5b		Total organic carbon (TOC)			
6	Total phosphorus	Total phosphorus			XXX
7	Specific conductance	Specific conductance			XXX
8	Suspended solids	Total suspended solids (TSS)	XXX		
		Volatile suspended solids (VSS)			
9	Total metals	Aluminum			XXX
		Beryllium			XXX
		Cadmium			XXX
		Chromium			XXX
		Cobalt			XXX
		Copper			XXX
		Lead			XXX
		Molybdenum			XXX
		Nickel			XXX
		Silver			XXX
		Thallium			XXX
		Vanadium			XXX
		Zinc			XXX
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)			XXX
12	Mercury	Mercury			XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE J - SAND AND GRAVEL CATEGORY

		EFFLUENT STREAM TYPE:	Wash Water		
		TOXICITY TESTS SAMPLING FREQUENCY:	A		
		FREQUENCY OF SAMPLING: (but see subsection 5(6))	3W	M	A
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED			
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX
		1,1,2-Trichloroethane			XXX
		1,1-Dichloroethane			XXX
		1,1-Dichloroethylene			XXX
		1,2-Dichlorobenzene			XXX
		1,2-Dichloroethane (Ethylene dichloride)			XXX
		1,2-Dichloropropane			XXX
		1,3-Dichlorobenzene			XXX
		1,4-Dichlorobenzene			XXX
		Bromoform			XXX
		Bromomethane			XXX
		Carbon tetrachloride			XXX
		Chlorobenzene			XXX
		Chloroform			XXX
		Chloromethane			XXX
		Cis-1,3-Dichloropropylene			XXX
		Dibromochloromethane			XXX
		Ethylene dibromide			XXX
		Methylene chloride			XXX
		Tetrachloroethylene (Perchloroethylene)			XXX
		Trans-1,2-Dichloroethylene			XXX
		Trans-1,3-Dichloropropylene			XXX
		Trichloroethylene			XXX
		Trichlorofluoromethane			XXX
		Vinyl chloride (Chloroethylene)			XXX
17	Volatiles, Non-Halogenated	Benzene			XXX
		Styrene			XXX
		Toluene			XXX
		o-Xylene			XXX
		m-Xylene and p-Xylene			XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE J - SAND AND GRAVEL CATEGORY

		EFFLUENT STREAM TYPE:	Wash Water		
		TOXICITY TESTS SAMPLING FREQUENCY:	A		
		FREQUENCY OF SAMPLING: (but see subsection 5(6))	3W	M	A
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED			
19	Extractables, Base Neutral	Acenaphthene			XXX
		5-nitro Acenaphthene			XXX
		Acenaphthylene			XXX
		Anthracene			XXX
		Benz(a)anthracene			XXX
		Benzo(a)pyrene			XXX
		Benzo(b)fluoranthene			XXX
		Benzo(g,h,i)perylene			XXX
		Benzo(k)fluoranthene			XXX
		Camphene			XXX
		1-Chloronaphthalene			XXX
		2-Chloronaphthalene			XXX
		Chrysene			XXX
		Dibenz(a,h)anthracene			XXX
		Fluoranthene			XXX
		Fluorene			XXX
		Indeno(1,2,3-cd)pyrene			XXX
		Indole			XXX
		1-Methylnaphthalene			XXX
		2-Methylnaphthalene			XXX
		Naphthalene			XXX
		Perylene			XXX
		Phenanthrene			XXX
		Pyrene			XXX
		Benzyl butyl phthalate			XXX
		Bis(2-Ethylhexyl) phthalate			XXX
		Di-n-butyl phthalate			XXX
		4-Bromophenyl phenyl ether			XXX
		4-Chlorophenyl phenyl ether			XXX
		Bis(2-Chloroisopropyl)ether			XXX
		Bis(2-Chloroethyl)ether			XXX
		2,4-Dinitrotoluene			XXX
		2,6-Dinitrotoluene			XXX

SCHEDULE J - SAND AND GRAVEL CATEGORY

		EFFLUENT STREAM TYPE:	Wash Water		
		TOXICITY TESTS SAMPLING FREQUENCY:	A		
		FREQUENCY OF SAMPLING: (but see subsection 5(6))	3W	M	A
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED			
19	Extractables, Base Neutral (continued)	Bis(2-Chloroethoxy)methane			XXX
		Diphenylamine			XXX
		N-Nitrosodiphenylamine			XXX
		N-Nitrosodi-n-propylamine			XXX
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX
		2,3,4,6-Tetrachlorophenol			XXX
		2,3,5,6-Tetrachlorophenol			XXX
		2,3,4-Trichlorophenol			XXX
		2,3,5-Trichlorophenol			XXX
		2,4,5-Trichlorophenol			XXX
		2,4,6-Trichlorophenol			XXX
		2,4-Dimethyl phenol			XXX
		2,4-Dinitrophenol			XXX
		2,4-Dichlorophenol			XXX
		2,6-Dichlorophenol			XXX
		4,6-Dinitro-o-cresol			XXX
		2-Chlorophenol			XXX
		4-Chloro-3-methylphenol			XXX
		4-Nitrophenol			XXX
		m-Cresol			XXX
		o-Cresol			XXX
		p-Cresol			XXX
		Pentachlorophenol			XXX
		Phenol			XXX
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX
		Octachlorodibenzo-p-dioxin			XXX
		Octachlorodibenzofuran			XXX
		Total heptachlorinated dibenzo-p-dioxins			XXX
		Total heptachlorinated dibenzofurans			XXX
		Total hexachlorinated dibenzo-p-dioxins			XXX
		Total hexachlorinated dibenzofurans			XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE J - SAND AND GRAVEL CATEGORY

		EFFLUENT STREAM TYPE:	Wash Water		
		TOXICITY TESTS SAMPLING FREQUENCY:	A		
		FREQUENCY OF SAMPLING: (but see subsection 5(6))	3W	M	A
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED			
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsections 6(11) to (13))	Total pentachlorinated dibenzo-p-dioxins			XXX
		Total pentachlorinated dibenzofurans			XXX
		Total tetrachlorinated dibenzo-p-dioxins			XXX
		Total tetrachlorinated dibenzofurans			XXX
25	Solvent Extractables	Oil and grease	XXX		
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)			XXX
28a	Open Characterization - Volatiles				XXX
28b	Open Characterization - Extractables				XXX
29	Open Characterization - Elemental	Aluminum			XXX
		Antimony			XXX
		Arsenic			XXX
		Barium			XXX
		Beryllium			XXX
		Bismuth			XXX
		Boron			XXX
		Cadmium			XXX
		Calcium			XXX
		Cerium			XXX
		Cesium			XXX
		Chromium			XXX
		Cobalt			XXX
		Copper			XXX
		Dysprosium			XXX
		Erbium			XXX
		Europium			XXX

		EFFLUENT STREAM TYPE:	Wash Water		
		TOXICITY TESTS SAMPLING FREQUENCY:	A		
		FREQUENCY OF SAMPLING: (but see subsection 5(6))	3W	M	A
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED			
29	Open Characterization - Elemental (continued)	Gadolinium			XXX
		Gallium			XXX
		Germanium			XXX
		Gold			XXX
		Hafnium			XXX
		Holmium			XXX
		Indium			XXX
		Iridium			XXX
		Iron			XXX
		Lanthanum			XXX
		Lead			XXX
		Lithium			XXX
		Lutetium			XXX
		Magnesium			XXX
		Manganese			XXX
		Mercury			XXX
		Molybdenum			XXX
		Neodymium			XXX
		Nickel			XXX
		Niobium			XXX
		Osmium			XXX
		Palladium			XXX
		Phosphorus			XXX
		Platinum			XXX
		Potassium			XXX
		Praesodymium			XXX
		Rhenium			XXX
		Rhodium			XXX
		Rubidium			XXX
		Ruthenium			XXX
		Samarium			XXX
		Scandium			XXX
		Selenium			XXX

		EFFLUENT STREAM TYPE:	Wash Water		
		TOXICITY TESTS SAMPLING FREQUENCY:	A		
		FREQUENCY OF SAMPLING: (but see subsection 5(6))	3W	M	A
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED			
29	Open Characterization - Elemental (continued)	Silicon			XXX
		Silver			XXX
		Sodium			XXX
		Strontium			XXX
		Sulfur			XXX
		Tantalum			XXX
		Tellurium			XXX
		Terbium			XXX
		Thallium			XXX
		Thorium			XXX
		Thulium			XXX
		Tin			XXX
		Titanium			XXX
		Tungsten			XXX
		Uranium			XXX
		Vanadium			XXX
		Ytterbium			XXX
		Yttrium			XXX
		Zinc			XXX
		Zirconium			XXX

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE K - TALC CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Minewater			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
2	Total cyanide	Total cyanide			XXX			XXX	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	XXX			XXX			XXX
4a	Nitrogen	Ammonia plus Ammonium		XXX			XXX		XXX
		Total Kjeldahl nitrogen							
4b		Nitrate + Nitrite			XXX			XXX	XXX
5a	Organic carbon	Dissolved organic carbon (DOC)			XXX			XXX	
5b		Total organic carbon (TOC)							
6	Total phosphorus	Total phosphorus			XXX			XXX	
7	Specific conductance	Specific conductance			XXX			XXX	XXX
8	Suspended solids	Total suspended solids (TSS)	XXX			XXX			XXX
		Volatile suspended solids (VSS)							
9	Total metals	Aluminum			XXX			XXX	
		Beryllium			XXX			XXX	
		Cadmium		XXX			XXX		XXX
		Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Lead			XXX			XXX	
		Molybdenum			XXX			XXX	
		Nickel			XXX			XXX	
		Silver			XXX			XXX	
		Thallium			XXX			XXX	
		Vanadium			XXX			XXX	
		Zinc			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE K - TALC CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Minewater			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
10	Hydrides	Antimony			XXX			XXX	
		Arsenic		XXX			XXX		XXX
		Selenium			XXX			XXX	
11	Chromium (Hexavalent) (but see subsection 6(9))	Chromium (Hexavalent)			XXX			XXX	
12	Mercury	Mercury			XXX			XXX	
14	Phenolics (4AAP)	Phenolics (4AAP)		XXX			XXX		XXX
15	Sulphide	Sulphide			XXX			XXX	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane			XXX			XXX	
		1,1,2-Trichloroethane			XXX			XXX	
		1,1-Dichloroethane			XXX			XXX	
		1,1-Dichloroethylene			XXX			XXX	
		1,2-Dichlorobenzene			XXX			XXX	
		1,2-Dichloroethane (Ethylene dichloride)			XXX			XXX	
		1,2-Dichloropropane			XXX			XXX	
		1,3-Dichlorobenzene			XXX			XXX	
		1,4-Dichlorobenzene			XXX			XXX	
		Bromoform			XXX			XXX	
		Bromomethane			XXX			XXX	
		Carbon tetrachloride			XXX			XXX	
		Chlorobenzene			XXX			XXX	
		Chloroform			XXX			XXX	
		Chloromethane			XXX			XXX	
		Cis-1,3-Dichloropropylene			XXX			XXX	
		Dibromochloromethane			XXX			XXX	
		Ethylene dibromide			XXX			XXX	
		Methylene chloride			XXX			XXX	
		Tetrachloroethylene (Perchloroethylene)			XXX			XXX	
		Trans-1,2-Dichloroethylene			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION
SCHEDULE K - TALC CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Minewater			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
16	Volatiles, Halogenated (continued)	Trans-1,3-Dichloropropylene			XXX			XXX	
		Trichloroethylene			XXX			XXX	
		Trichlorofluoromethane			XXX			XXX	
		Vinyl chloride (Chloroethylene)			XXX			XXX	
17	Volatiles, Non-Halogenated	Benzene			XXX			XXX	
		Styrene			XXX			XXX	
		Toluene			XXX			XXX	
		o-Xylene			XXX			XXX	
		m-Xylene and p-Xylene			XXX			XXX	
19	Extractables, Base Neutral	Acenaphthene			XXX			XXX	
		5-nitro Acenaphthene			XXX			XXX	
		Acenaphthylene			XXX			XXX	
		Anthracene			XXX			XXX	
		Benz(a)anthracene			XXX			XXX	
		Benzo(a)pyrene			XXX			XXX	
		Benzo(b)fluoranthene			XXX			XXX	
		Benzo(g,h,i)perylene			XXX			XXX	
		Benzo(k)fluoranthene			XXX			XXX	
		Camphene			XXX			XXX	
		1-Chloronaphthalene			XXX			XXX	
		2-Chloronaphthalene			XXX			XXX	
		Chrysene			XXX			XXX	
		Dibenz(a,h)anthracene			XXX			XXX	
		Fluoranthene			XXX			XXX	
		Fluorene			XXX			XXX	
		Indeno(1,2,3-cd)pyrene			XXX			XXX	
		Indole			XXX			XXX	
		1-Methylnaphthalene			XXX			XXX	
		2-Methylnaphthalene			XXX			XXX	
		Naphthalene			XXX			XXX	
		Perylene			XXX			XXX	
		Phenanthrene			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE K - TALC CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Minewater			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
19	Extractables, Base Neutral (continued)	Pyrene			XXX			XXX	
		Benzyl butyl phthalate			XXX			XXX	
		Bis(2-Ethylhexyl) phthalate			XXX			XXX	
		Di-n-butyl phthalate			XXX			XXX	
		4-Bromophenyl phenyl ether			XXX			XXX	
		4-Chlorophenyl phenyl ether			XXX			XXX	
		Bis(2-Chloroisopropyl)ether			XXX			XXX	
		Bis(2-Chloroethyl)ether			XXX			XXX	
		2,4-Dinitrotoluene			XXX			XXX	
		2,6-Dinitrotoluene			XXX			XXX	
		Bis(2-Chloroethoxy)methane			XXX			XXX	
		Diphenylamine			XXX			XXX	
		N-Nitrosodiphenylamine			XXX			XXX	
		N-Nitrosodi-n-propylamine			XXX			XXX	
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol			XXX			XXX	
		2,3,4,6-Tetrachlorophenol			XXX			XXX	
		2,3,5,6-Tetrachlorophenol			XXX			XXX	
		2,3,4-Trichlorophenol			XXX			XXX	
		2,3,5-Trichlorophenol			XXX			XXX	
		2,4,5-Trichlorophenol			XXX			XXX	
		2,4,6-Trichlorophenol			XXX			XXX	
		2,4-Dimethyl phenol			XXX			XXX	
		2,4-Dinitrophenol			XXX			XXX	
		2,4-Dichlorophenol			XXX			XXX	
		2,6-Dichlorophenol			XXX			XXX	
		4,6-Dinitro-o-cresol			XXX			XXX	
		2-Chlorophenol			XXX			XXX	
		4-Chloro-3-methylphenol			XXX			XXX	
		4-Nitrophenol			XXX			XXX	
		m-Cresol			XXX			XXX	
		o-Cresol			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE K - TALC CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Minewater			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
20	Extractables, Acid (Phenolics) (continued)	p-Cresol			XXX			XXX	
		Pentachlorophenol			XXX			XXX	
		Phenol			XXX			XXX	
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans (but see subsection 6(11) to (13))	2,3,7,8-Tetrachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzo-p-dioxin			XXX			XXX	
		Octachlorodibenzofuran			XXX			XXX	
		Total heptachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total heptachlorinated dibenzofurans			XXX			XXX	
		Total hexachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total hexachlorinated dibenzofurans			XXX			XXX	
		Total pentachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total pentachlorinated dibenzofurans			XXX			XXX	
		Total tetrachlorinated dibenzo-p-dioxins			XXX			XXX	
		Total tetrachlorinated dibenzofurans			XXX			XXX	
25	Solvent Extractables	Oil and grease	XXX			XXX			XXX
27	Polychlorinated Biphenyls (but see subsection 6(10))	PCBs (Total)			XXX			XXX	
28a	Open Characterization - Volatiles				XXX			XXX	
28b	Open Characterization - Extractables				XXX			XXX	
29	Open Characterization - Elemental	Aluminum			XXX			XXX	
		Antimony			XXX			XXX	
		Arsenic			XXX			XXX	
		Barium			XXX			XXX	
		Beryllium			XXX			XXX	
		Bismuth			XXX			XXX	
		Boron			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE K - TALC CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Minewater			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Cadmium			XXX			XXX	
		Calcium			XXX			XXX	
		Cerium			XXX			XXX	
		Cesium			XXX			XXX	
		Chromium			XXX			XXX	
		Cobalt			XXX			XXX	
		Copper			XXX			XXX	
		Dysprosium			XXX			XXX	
		Erbium			XXX			XXX	
		Europium			XXX			XXX	
		Gadolinium			XXX			XXX	
		Gallium			XXX			XXX	
		Germanium			XXX			XXX	
		Gold			XXX			XXX	
		Hafnium			XXX			XXX	
		Holmium			XXX			XXX	
		Indium			XXX			XXX	
		Iridium			XXX			XXX	
		Iron			XXX			XXX	
		Lanthanum			XXX			XXX	
		Lead			XXX			XXX	
		Lithium			XXX			XXX	
		Lutetium			XXX			XXX	
		Magnesium			XXX			XXX	
		Manganese			XXX			XXX	
		Mercury			XXX			XXX	
		Molybdenum			XXX			XXX	
		Neodymium			XXX			XXX	
		Nickel			XXX			XXX	
		Niobium			XXX			XXX	
		Osmium			XXX			XXX	
		Palladium			XXX			XXX	
		Phosphorus			XXX			XXX	
		Platinum			XXX			XXX	

ONTARIO MINERAL INDUSTRY SECTOR - GROUP B REGULATION

SCHEDULE K - TALC CATEGORY

		EFFLUENT STREAM TYPE:	Quarry Water			Minewater			Storm Water
		TOXICITY TESTS SAMPLING FREQUENCY:	SA			SA			None
		FREQUENCY OF SAMPLING:	3W	M	SA	3W	M	SA	M / at time of discharge
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED							
29	Open Characterization - Elemental (continued)	Potassium			XXX			XXX	
		Praesodymium			XXX			XXX	
		Rhenium			XXX			XXX	
		Rhodium			XXX			XXX	
		Rubidium			XXX			XXX	
		Ruthenium			XXX			XXX	
		Samarium			XXX			XXX	
		Scandium			XXX			XXX	
		Selenium			XXX			XXX	
		Silicon			XXX			XXX	
		Silver			XXX			XXX	
		Sodium			XXX			XXX	
		Strontium			XXX			XXX	
		Sulfur			XXX			XXX	
		Tantalum			XXX			XXX	
		Tellurium			XXX			XXX	
		Terbium			XXX			XXX	
		Thallium			XXX			XXX	
		Thorium			XXX			XXX	
		Thulium			XXX			XXX	
		Tin			XXX			XXX	
		Titanium			XXX			XXX	
		Tungsten			XXX			XXX	
		Uranium			XXX			XXX	
		Vanadium			XXX			XXX	
		Ytterbium			XXX			XXX	
		Yttrium			XXX			XXX	
		Zinc			XXX			XXX	
		Zirconium			XXX			XXX	
IM2	Fibrous Chrysotile	Fibrous Chrysotile			XXX			XXX	

SCHEDULE L - SAMPLING PRINCIPLES

Column 1	Column 2	Column 3	Column 4	Col. 5	Column 6	Column 7
ANALYTICAL TEST GROUP	LABORATORY SAMPLE CONTAINER	LABORATORY CONTAINER PRE-TREATMENT	TEST SPECIFIC SAMPLING PRECAUTIONS	MIN. SAM. VOL.	PRESERVATION METHOD	MAX. STORAGE TIME (DAYS)
Chloride IM1	Sample containers and caps/ liners must be composed only of one or more of the following materials: fluorocarbon resin, polyethylene terephthalate, glass, polystyrene, polypropylene, high or low density polyethylene. Metallic foil should not be used.	Generally no pre-treatment required for new containers.	If sample is high (>5%) in hydrocarbons or organic solvents, use glass or fluorocarbon resin sample container only.	50mL	None	28
Fibrous Chrysotile IM2	Wide mouth plastic, new	See Analytical Test Group IM1	Do not agitate so that clusters are not broken into fibres.	1L	None	2 before filtration, unlimited after
Fluoride IM3	See Analytical Test Group IM1	See Analytical Test Group IM1	See Analytical Test Group IM1	50 mL	See Analytical Test Group IM1	28
Sulphate IM4	See Analytical Test Group IM1	See Analytical Test Group IM1	See Analytical Test Group IM1	50mL	None	28

SCHEDULE M - ANALYTICAL PRINCIPLES & ANALYTICAL METHOD DETECTION LIMITS

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
ANALYTICAL TEST GROUP #	PARAMETERS CONVENTIONAL AND METAL PARAMETERS	SAMPLE PREPARATION METHOD PRINCIPLES	INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	ALTERNATE INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	ANALYTICAL METHOD DETECTION LIMITS
IM1	Chloride	Preparation for measurement system as appropriate	Ion Chromatography or Colourimetry or Titration	N/A	2 mg/L
IM2	Fibrous Chrysotile	Filtration onto membrane filter	Transmission Electron microscopy Electron diffraction	N/A	0.04 million fibres/L
IM3	Fluoride	See Analytical Test Group IM1	Colourimetry or Specific Ion Electrode	N/A	0.1 mg/L
IM4	Sulphate	See Analytical Test Group IM1	Ion Chromatography		5 as sulphate

PART D

EXPLANATORY NOTES
TO THE DRAFT EFFLUENT MONITORING REGULATION
FOR THE
ONTARIO MINERAL INDUSTRY: GROUP B
INDUSTRIAL MINERALS SECTOR

EXPLANATORY NOTES TO THE DRAFT EFFLUENT MONITORING REGULATION FOR THE ONTARIO MINERAL INDUSTRY: GROUP B INDUSTRIAL MINERALS SECTOR

INTRODUCTION

The Explanatory Notes are meant to provide, where appropriate, a more detailed description of each of the sections in the Draft Effluent Monitoring Regulation for the INDUSTRIAL MINERALS (IM) Sector, in order to facilitate the reader's comprehension of the requirements.

SECTION 1: **Definitions**

This section does not redefine the terms which are already defined in the ENVIRONMENTAL PROTECTION ACT under which the IM Regulation is written.

This section of the Regulation provides:

- clarification of terms used in the Regulation having several possible interpretations;

- definitions of technical terms used in the Regulation which may not be in common usage;

- definitions for those terms which have a different meaning in the Regulation from those found in a dictionary or through common use;

- definitions of terms with an alternate use in the IM Regulation from that in the General Regulation; and

- definitions of terms specific to the IM Sector.

Subsection **1**(2) states that the definitions in section **1** of the General Regulation also apply to this Regulation. However, a re-defined term in the IM Regulation supercedes that of the General Regulation.

All of the definitions in the General Regulation have been applied to the Industrial Minerals Sector Regulation with the following exceptions;

- "batch discharge" has been redefined to include any non-continuous discharge of effluent to a surface watercourse;
- "characterization" has been redefined to reference the analytical parameters specific to the IM Sector;
- "grab sample" has been redefined to extend the period over which the sample may be collected from 15 minutes to 1 hour.

The following definitions are included in the Industrial Minerals Sector rather than the General Regulation as they are referred to only in the context of the Industrial Minerals Sector Regulation:

- "calculated retention time";
- "cement plant effluent";
- "cement plant effluent stream";
- "cement plant effluent sampling point";
- "grab-composite sample";
- "graphite plant effluent";
- "graphite plant effluent stream";
- "graphite plant effluent sampling point";
- "gypsum plant effluent";
- "gypsum plant effluent stream";
- "gypsum plant effluent sampling point";
- "lime plant effluent";
- "lime plant effluent stream";
- "lime plant effluent sampling point";
- "magnesium plant effluent";
- "magnesium plant effluent stream";
- "magnesium plant effluent sampling point";
- "minewater effluent";
- "minewater effluent stream";
- "minewater effluent sampling point";
- "quarry water effluent";
- "quarry water effluent stream";
- "quarry water effluent sampling point";
- "settling pond";
- "wash water effluent";
- "wash water effluent stream";
- "wash water effluent sampling point".

SECTION 2: **Purpose**

The purpose of the IM Regulation is to establish a data base on effluent quality in the industrial minerals sector. The data collected under this Regulation will be used, along with other pertinent information such as available treatment technology, to develop effluent limits and to quantify the mass loadings of monitored contaminants discharged into surface watercourses.

SECTION 3: **Application**

Section 3 provides an overview of the requirements of this Regulation and to whom they apply.

Regulated Plants:

According to subsection **3**(1), those plants which are obligated to comply with this Regulation are listed in Schedule A. However, if there is any change in the name, operator, or owner of the site, then the owner is required to notify the director of any such changes, in writing, within 30 days according to section **14**.

Note that the plants listed in Schedule A are organized into categories. Due to relatively common production practices employed for the manufacture and/or mining of products in this sector, it was possible to group the sector companies into nine categories. For the purpose of categorization within this Regulation, the groupings include:

1. CEMENT;
2. CHEMICAL LIME;
3. CLAY & SHALE;
4. GRAPHITE;
5. GYPSUM;
6. MAGNESIUM;
7. QUARRIES;
8. SAND & GRAVEL; and,
9. TALC.

Exemptions:

Since 20 sites were selected as representative sites for monitoring from the Quarries category, the remaining sites are designated as **non-monitoring sites** in Schedule A. These sites are only required to fulfill the reporting requirements as stipulated in subsections **14**(1) to (8) of the draft IM Monitoring Regulation. The report must be submitted at least 30 days prior to the day on which the first set of samples is required to be collected by the remaining sites.

Sites listed under the Quarries or Sand & Gravel categories may be exempted from all monitoring requirements . If the discharger can demonstrate by means of a certified report from any professional engineer registered in Ontario that the total amount of effluent discharged to a surface watercourse during a period of peak flow amounts to less than 50,000 liters per day, then that discharger qualifies for the exemption. Since most effluents within these categoriess are discharged on a batch-type basis, the volume of discharge is to be calculated as an average over thirty consecutive days during the months of operation of the plant and during a period of peak discharge. It is expected that peak discharge will occur during spring thaw and/or periods of heavy rainfall.

Unless otherwise specified within the IM Monitoring Regulation, a discharger is relieved of the duty to collect and analyze a sample within a certain period, if for that period of time there is no discharge.

Monitoring Requirements:

Since the IM Regulation is written within the context of the General Effluent Monitoring Regulation, compliance with this regulation presupposes conformity to the General Regulation. Unless stated otherwise in this Regulation, all the monitoring requirements for sampling, flow measurement, toxicity testing and analysis within the General Regulation also apply to the IM Regulation. Schedules L and M were included to provide sampling and analytical obligations in respect of parameters which are specific to the Industrial Minerals Sector.

External Contracting:

Subsection **3**(8) allows the requirements of the IM Sector and the General Regulation to be discharged to a second party working on behalf of the direct discharger. Thus, a consultant or laboratory can be used by the discharger to carry out any or all of the requirements under the Regulation.

SECTION 4: **Sampling Points**

Section 4 specifies the criteria for establishing sampling points on an effluent stream or streams which apply to this sector.

Sampling Point:

In section **4**(1), sampling points are established based on the stream classifications pertaining to the IM Sector. These stream classifications must be included in the Initial Report which is required to be submitted under section **14**.

Each direct discharger listed in Schedule A is assigned to a category. In most cases, the stream classifications are common to each category with only a few exceptions on a site specific basis. Each site listed in Schedule A must establish sampling points on all effluent streams which conform to the definition of an effluent stream as per the category specific monitoring schedule for that discharger, provided that the effluent stream exists on the discharger's site.

The following table provides a reference as to which streams apply to each category.

TABLE 1. Effluent Stream Types

SCHEDULE	CATEGORY	EFFLUENT STREAM TYPE
C	Cement	Quarry Water Cement Plant Storm Water
D	Chemical Lime	Lime Plant Storm Water
E	Clay & Shale	Storm Water
F	Graphite	Graphite Plant Storm Water
G	Gypsum	Minewater Gypsum Plant Storm Water
H	Magnesium	Magnesium Plant Storm Water
I	Quarries	Quarry Water Wash Water Storm Water
J	Sand & Gravel	Wash Water
L	Talc	Quarry Water Minewater Storm Water

SECTION 5: **Sampling Principles**

Section **5** defines the frequencies and techniques for sampling which are to be used in collecting samples under the IM Monitoring Regulation.

Sampling Methods:

A discharger is required to collect composite or grab-composite samples from all the established sampling points with the following exceptions;

1. any storm water effluent sampling points, and
2. quarry water or wash water effluent sampling points provided that the effluent is held in a settling pond for a minimum calculated retention time of 24 hours.

Exception (2), applies only to dischargers whose plants are in the Quarries or Sand & Gravel categories. The above exceptions do not apply for samples which are collected for the purpose of characterization or open characterization under section **6**.

In order to qualify under exception (2), a discharger must determine the calculated retention time which applies to the effluent stream in question.

$$\text{calculated retention time} = \frac{\text{volume of settling pond } [m^3]}{\text{discharge of effluent}^* \ [m^3/\text{day}]}$$

* average over 30 consecutive days, during periods of peak discharge.

Each qualifying Quarry or Sand & Gravel operation must collect a sample on a rotating basis (i.e in the morning on the 1st day that sampling is required and in the afternoon on the 2nd day of sampling) allowing at least 2 hours between the sampling time of each day (see subsection **5**(7)).

Grab samples are allowed for the collection of samples from sampling points which are exempt from grab-composite or composite sampling. This applies to storm water sampling points or qualifying quarry water and wash water effluent sampling points.

A grab-composite sample is composed of three individual grab samples of equal volume which are collected over the course of an operating day. The time interval between collecting samples must be at least two hours.

Special requirements apply to samples which are collected for the purpose of analysis for any of the analytical test groups 15 to 18 and 28a. These must consist of three equal volume grab samples which are combined according to the specifications set out in Schedule 1 of the General Effluent Monitoring Regulation.

With respect to the samples collected, the sample volume required to be collected must be sufficient to satisfy the analytical requirements. Method detection limits are specified in the General Regulation in Schedule 3 and in Schedule M of this Regulation. The testing laboratory must be able to meet these limits with the volume of sample collected. Although recommended sample volumes are provided, these may vary depending on the testing laboratory.

Monitoring Parameters & Frequency:

The monitoring schedules for each category are provided in Schedules C to K. Each category has a monitoring list for each stream classification within that category. The monitoring list indicates the parameters to be analyzed for and how often a sample is to be collected from that stream for analysis.

References to the Regulation are made on each schedule for any deviations from the category's monitoring parameters.

SECTION 6: **Characterization and Open Characterization**

Parameters:

The term characterization is used to identify a set of analyses which are intended to provide a comprehensive assessment of the chemical contaminants present in the effluent. The characterization list provided in Schedule B includes all of the parameters for analysis within the Industrial Minerals Sector. The parameters to be analyzed for completing a characterization analysis are listed in the category-specific monitoring schedules C to K.

Open characterization refers to analysis of Analytical Test Groups 28a, 28b and 29. The analytical methodology differs from a characterization. It is often referred as an open scan. Its purpose is to identify the presence of as many compounds as possible with an attempt to quantify their presence within the limits of the methodology.

The principles and protocols for collecting and analyzing characterization and open characterization samples are outlined in sections 3 and 4 of the General Regulation, respectively.

Frequency:

For the Quarries and Sand & Gravel categories, a set of analyses for characterization and open characterization is required once during the year of monitoring for this Regulation. Each of the other categories must collect and analyze samples for the purpose of characterization and open characterization twice over the year of monitoring, on a semi-annual basis.

The frequency of analysis for some compounds on the category-specific characterization monitoring lists of Schedule C to K, may vary on a site specific basis. Any exceptions are noted, with specific reference to the Regulation, directly on the monitoring schedules.

Samples must be collected on the same day that a set of samples is collected for the purpose of monthly monitoring under section **9**.

SECTION 7: **Thrice Weekly Monitoring**

Parameters:

All effluent streams, with the exception of storm water, must be monitored three times per week for the following Analytical Test Groups (ATG):

-	Group 3	Hydrogen Ion (pH);
-	Group 8	Suspended Solids; and
-	Group 25	Oil and Grease (solvent extractables).

These parameters are included under the thrice weekly (3W) columns of the category-specific monitoring schedules of Schedules C to K.

Frequency:

Samples collected to satisfy the requirements for thrice weekly monitoring must be taken at an interval of at least 24 hours (e.g. three sets of samples collected on the same day would not be acceptable).

Exemptions:

Dischargers that belong to the Quarries or Sand & Gravel categories that treat and hold their effluent in a settling pond for a minimum calculated retention time of 24 hours prior to discharge, qualify for a reduction in the monitoring frequency for thrice weekly parameters from three times per week to once per week. This is discussed in greater detail in section **8**.

If, during a sampling period of three consecutive days, a sample cannot be collected due to insufficient flow, then the discharger is exempted from his monitoring obligation for that period.

SECTION 8: **Weekly Monitoring**

Application:

Only dischargers in the Quarries and Sand & Gravel categories who are exempted from thrice weekly monitoring under section **7**, are obligated to conduct weekly monitoring. The same parameters referred to in section **7** apply to weekly monitoring.

Frequency:

Samples collected to satisfy the requirements for weekly monitoring must be taken at an interval of at least 3 days.

Exemption:

If, during a sampling period of seven consecutive days, a sample cannot be collected due to insufficient flow, then the discharger is exempted from his monitoring obligation for that period.

SECTION 9: **Monthly Monitoring**

Application:

All effluent streams have monthly monitoring requirements. Storm water is a special case and is considered in section **10**.

Parameters:

The parameters required to be monitored are listed under Monthly (M) column of Schedules C to K for the respective categories and stream classifications.

The parameters selected for monthly monitoring include:

- Group 4a Ammonia + Ammonium;
- Group 4b Nitrate + Nitrite;
- Group 9 Total Metals (as applicable);
- Group 12 Mercury;
- Group 14 Phenolics (4AAP);
- Group 15 Sulphide;
- Group 25 Oil and Grease (solvent extractables); and
- Group IM3 Fluoride.

A selection of parameters from the above ATG's are required. The actual list of parameters to be monitored monthly depends on the category.

In a limited number of cases, deviations were made from the category-specific monitoring schedules to account for site specific factors. For example, in the Chemical Lime category, only those dischargers that use explosives are required to analyze for group 4a, ammonia + ammonium, on a monthly basis. At the Chemical Lime plant known as, Reiss Lime located in Spragge, Ontario site-specific monitoring is required on a monthly basis for the following ATG's:

- Group 9 Copper

-	Group 14	Phenolics (4AAP); and
-	Group 20	Extractables, acid (Phenolics).

Site specific monitoring is also required at the 3M facility on the quarry water effluent for the ATG - Group 16 Volatiles, halogenated.

Frequency:

Samples are to be collected and analyzed at least once per month with a time interval of at least 15 days between consecutive samples. The samples must be collected on the same day that a sample is collected under sections **7** or **8**.

Exemptions:

If, during a sampling period of thirty consecutive days, a sample cannot be collected due to insufficient flow, then the discharger is exempted from the monitoring obligation for that period.

SECTION 10: **Monthly Monitoring - Storm Water**

Frequency:

Samples must be collected from storm water sampling points at least once per month at the time of discharge.

In the event that the discharger cannot obtain a sample in any month due to non-flow conditions (no discharge over a 30 day period), then the discharger is subject to the following conditions:

(a) any discharger within the Clay & Shale category must collect a compensating sample in another month during which there is a discharge; however, no more than two sets of samples are required to be collected in any one month period;

(b) dischargers within any of the categories, other than Clay & Shale are exempted from the monitoring obligation for storm water in that month.

Parameters:

The parameters to be analyzed are category-specific, and are listed in Schedules C to K under the [M / at time of discharge] Column. In general the following parameters were included for analysis of storm water:

-	Group 3	pH;
-	Group 4a	ammonia + ammonium;
-	Group 4b	nitrate + nitrite;

Group 7	specific conductance;
Group 8	suspended solids;
Group 9	cadmium, copper;
Group 14	phenolics (4AAP);
Group 25	oil and grease;
Group IM1	chloride;
Group IM3	fluoride;and
Group IM4	sulphate.

SECTION 11: **Quality Control**

Scope:

The purpose of the quality control samples is to provide information regarding the quality of the effluent samples collected and an indication of possible field contamination. Information obtained from the quality control samples will be used as an indicator of sampling variability.

In respect of samples collected for frequent routine monitoring (i.e. thrice weekly or weekly), the collection of a set of quality control samples requires the following:

- the collection of a duplicate sample; to be collected on a monthly basis and analyzed for those parameters which are required on a weekly or thrice weekly basis.

In respect of samples collected for less frequent routine monitoring (i.e. monthly), the preparation and processing of a set of quality control samples requires the following:

- the collection of a duplicate sample; to be collected on a quarterly basis for those parameters which are required on a monthly basis;

- the preparation and processing of a travelling blank sample; to be collected on a quarterly basis for parameters in ATG's 16 to 20, and analyzed for those parameters which are required to be analyzed on a monthly basis in ATG's 16 to 20; and

- the preparation and processing of a travelling spiked blank sample; to be collected on a quarterly basis for parameters in ATG's 16 to 20, and analyzed for those parameters which are required to be analyzed on monthly basis in ATG's 16 to 20.

In respect of samples collected for characterization (i.e. annually or semi-annually), the preparation and processing of a set of quality control samples require the following:

- the preparation and processing of a travelling blank sample; to be collected on an annual basis and analyzed for parameters in ATG's 16 and 20;

- the preparation and processing of a travelling spiked blank sample; to be collected on an annual basis for parameters in ATG's 16 to 20, and analyzed for parameters in ATG's 16 and 20.

A duplicate sample provides a measure of the reproducibility of sampling techniques used at the site, as well as an indication of the integrity of the sample containers.

A travelling blank sample will provide an indication of any problems caused by sample contamination. A sample may be contaminated due to extraneous volatiles present in the atmosphere.

A travelling spiked blank sample should provide an indication of the degree of degradation of the parameters from the time of sampling to analysis. This may also reflect a similar phenomena in the effluent sample. Only analytical test groups 16 through 24, 26 and 27 are affected since they are most likely to deteriorate in the unpreserved solution due to their volatility. Travelling spiked blank samples are not required for most conventionals and metals since they are inherently relatively stable, or are stabilized with the addition of a preservative.

Application:

One sampling point from each plant requires the collection and analysis of quality control samples. The stream selected for QA/QC must be one which has the most stringest monitoring requirements according the the plant's monitoring requirements under this regulation. Storm Water sampling points do not require the collection of quality control samples with the exception of the Clay & Shale category. Dischargers within the Clay & Shale category must collect a set of quality control samples for one storm water sampling point at each plant.

Frequency:

A set of quality control samples must be collected and/or prepared for samples which are collected for thrice weekly or weekly monitoring, on a monthly basis. QA/QC is required for monthly samples, on a quarterly basis for monthly parameters, and for ATG's 16 to 20 (if present on schedule for monthly monitoring). For characterization samples, QA/QC is required annually for ATG's 16 and 20. The quality control samples must be collected on the same operating day as the collection of samples for routine monitoring.

SECTION 12: **Toxicity Testing**

Application:

Toxicity test samples must be collected at each effluent sampling point designated for toxicity testing in the category-specific monitoring schedules of Schedule A. Toxicity testing is not required to be performed on storm water effluent samples unless the discharger belongs to the Clay & Shale category.

Section 5 of the General Regulation specifies the test protocols which must be followed for the fish toxicity test and the Daphnia magna acute lethality toxicity test. The term toxicity testing refers to both of the previously cited tests. The test protocols are published in the following Ministry of the Environment documents:

- "Protocol to Determine the Acute Lethality of Liquid Effluents to Fish", dated July 1983; and
- "Daphnia magna Acute Lethality Toxicity Test Protocol" dated April 1988.

Frequency:

All categories except Sand & Gravel and Quarries, are required to conduct two toxicity tests; once during each of the first two quarters of monitoring. The Quarries and Sand & Gravel categories are obligated to complete one toxicity test during the first two quarters. The time interval between consecutive quarterly samples must be greater than 45 days.

Samples should be collected on the same day in which a set of samples is collected for characterization under section **6**. If this is not possible, samples for toxicity testing should be colled on the same day in which a set of samples is collected for monthly monitoring under section **9**.

The obligations for toxicity testing for the remainder of the monitoring year depend on the results obtained during the first two quarters. The discharger is exempted from any further toxicity testing as long as the following conditions are met;

(a) the fish mortality is no more than 20% of the population at each effluent concentration in the serial dilutions, and

(b) the results from the Daphnia magna acute lethality test are non-lethal.

If the discharger should fail in satisfying any of the above requirements, then that discharger is obligated to complete toxicity testing on a monthly basis for the remaining six months. Dischargers in the Quarries and Sand & Gravel categories are only obligated to perform toxicity testing for an additional three consecutive months.

SECTION 13: **Flow Measurement**

Accuracy and Calibration:

The flow of any effluent discharge to a surface watercourse, with the exception of storm water , is required to be measured or estimated within an accuracy of +/- 20%. The discharger must disclose the method used for measuring or estimating flow and verify that the method and/or equipment is capable of meeting the required accuracy. The flow must be calibrated or verified according to specifications in subsection **13**(5) of the IM Regulation before the collection of the first set of monitoring samples.

Application:

While a continuous flow measurement device would be most convenient for measuring flow, the requirements for flow measurement only specify the need for spot measurements. Measurement or estimation of flow is required for any cement plant, lime plant, graphite plant, gypsum plant, magnesium plant, minewater, quarry water and wash water effluent streams. An estimate or measurement of discharge flow is required from the effluent sampling point each time a sample is collected.

Flow measurements must be taken in conjunction with sampling. For example, it three grabs are required for a grab-composite, then the flow should be measured or estimated each time a grab sample is collected.

With respect to any batch effluent discharge, an estimation of the duration and approximate volume of each discharge is required.

The measurement of flow in an effluent stream is achieved through the use of both a primary and secondary flow measurement device. The primary device measures the physical parameter which relates to flow. Secondary measurement devices are typically electronic interfaces with the primary devices which interpret the measurements and convert them to a functional number in terms of flow. Typical primary measurement devices include:

- Differential pressure devices (i.e. venturi meters, orifice plates)
- Electromagnetic devices (i.e. magnetic flow meters);
- Differential head devices (i.e. weirs, flumes);
- Sonic techniques (i.e. ultrasonic flow meters).

In the case where effluent is discharged by pumping, the pumping rate estimate may be used as a measurement of flow provided that it meets the accuracy requirements.

Discharge records should be maintained for any discharge from an effluent stream which is released on a non-continuous basis. Daily records of discharge flow and duration should be kept in order to satisfy the reporting requirements for the flow discharge report referred to in section **13**. The report must include an estimate of the total monthly discharge of effluent.

Estimation techniques for determining the volume of discharge over a finite period of time, may include:

- Pumping Rate over time; or
- Draw down over time for a pit or quarry with a predetermined geometrical configuration.

SECTION 14: **Reporting**

Section **7** of the General Regulation outlines the reporting requirements for each direct discharger. The contents of an Initial Report to be submitted prior to monitoring under the IM Regulation are outlined in the General Regulation.

All information which is considered by the plant to be confidential business information must be so identified on each page submitted to the Ministry.

Only a modified version of an Initial Report is required from those plants in the Quarries category, which are designated as non-monitoring sites according to Schedule A. In addition to the Initial Report, these plants are also required to submit information regarding any changes such as legal ownership, modifications to the process etc..

All plants, with the exception of non-monitoring sites must submit the following reports within the timing permitted in order to be in compliance with the IM Regulation:

- **initial report**, due within 7 days after the first day of the third month following filing of the IM Regulation;
- **a sampling schedule**, at least thirty days prior to the collection of the first sample;
- **report of any changes with respect to the initial report**, due within thirty days of any changes made after the submission of the initial report;
- **results of all routine** (thrice weekly, weekly and monthly) **monitoring** analyses and flow measurement information, due within sixty days after the samples were collected;
- **results of all characterization analyses**, due within 90 days after the day on which the samples were taken;
- **results of toxicity testing**, due within 60 days after the samples were collected ;

- **report of any malfunctions/remedial action**, due within 60 days after the occurrence of a malfunction; and a
- **flow discharge report**, due within thirty days after the end of each quarter.

In addition to the above reports, certain information must be made available to the Director on an ongoing basis during the life of the regulation. Such information includes;

- **any change of name or ownership of its plant**, due no later than 30 days after any such change;
- **any process change** that may adversely affect the quality of the effluent, due no later than 30 days after the event;
- **any redirection of or change in type of an effluent stream**; due thirty days after the event.

A guidance document will be available from the Ministry prior to promulgation of the IM Regulation to provide assistance in preparing the Initial Report. This report is intended to provide the Ministry with a clear understanding of plant processes, and the procedures each plant will follow in carrying out the requirements of the IM Regulation. Four copies of the Initial Report, including any attachments should be provided.

A schedule of sampling dates and times for monthly and characterization sampling is required for Ministry Inspection Purposes. Inspection samples may be collected from the Ministry concurrent with collection of samples by the plant site. Sampling procedures used at the plant will also be checked during Ministry Inspections.

Results from all analyses performed by the laboratory must be reported, including all positive numerical values at or above the laboratory calculated method detection limit. In those cases where a laboratory has a method detection limit lower than the maximum allowed by the General Regulation, all positive values below the MISA method detection limit must be reported. The format for submission of analytical and flow data is specified in sections 7(2) through 7(7) of the General Regulation.

The information to be included in the Flow Discharge Report will be used to estimate total loadings of contaminants released to a surface watercourse from a given plant. The components of this report are provided in section **14**(16) of the IM Regulation.

All other records which are required to be kept by this section are primarily for the inspection purposes to ensure compliance with the IM Regulation. The records should be kept for a period of two years beyond the submission of the last report.

SECTION 15: **Commencement**

The Initial Report is due three months and seven days following promulgation of the Regulation.

The sampling, analytical, flow measurement, toxicity testing and reporting requirements come into force on the first day of the sixth month following promulgation. This will allow for an implementation period of five to six months after promulgation of the IM Regulation, depending on the date of promulgation. The implementation period is intended to provide sufficient time to allow the plant site to purchase and install equipment, negotiate contracts with laboratories, set up their monitoring programs and train personnel.

SECTION 16: **Revocation**

The requirements of this regulation are revoked one year after coming into force. These include; Characterization, routine monitoring, flow measurement, storm water monitoring, quality control monitoring, toxicity testing and reporting requirements for the flow discharge report.

PART E

MISA ADVISORY COMMITTEE RECOMMENDATION
ON THE
INDUSTRIAL MINERALS SECTOR
DRAFT EFFLUENT MONITORING REGULATION

Ministry of the Environment
Ministère de l'Environnement
Ontario

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Toronto, Ontario
M4V 1P5

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Toronto (Ontario)
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August 2, 1989

The Honourable Jim Bradley
Minister of the Environment
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

Dear Mr. Minister:

Attached is the MISA Advisory Committee Report Regarding the Draft Effluent Monitoring Regulations for the Industrial Minerals Sector provided in response to your request of July 18, 1989 for advice on the draft Development Document.

The report has the unanimous support of MISA Advisory Committee members, including the representative of the Industrial Minerals Sector, Ms. Elizabeth Gardiner.

The Committee commends the industry and the Ministry for diligently undertaking a successful consultative process, leading to the submission of a generally complete and well thought-out regulation package.

Respectfully submitted,

J.W. MacLaren

Jim MacLaren, Chairman
for the MISA Advisory Committee

ONTARIO MINISTRY OF THE ENVIRONMENT
MUNICIPAL/INDUSTRIAL STRATEGY FOR ABATEMENT

MISA ADVISORY COMMITTEE

REPORT regarding the EFFLUENT MONITORING REGULATIONS FOR THE ONTARIO MINERAL INDUSTRY GROUP "B" INDUSTRIAL MINERAL SECTOR

August 1989

Jim MacLaren
Chairman

Elizabeth Gardiner
representative for the
Industrial Mineral Sector

August 2, 1989

MISA ADVISORY COMMITTEE REPORT regarding the EFFLUENT MONITORING REGULATIONS FOR THE ONTARIO MINERAL INDUSTRY GROUP "B" INDUSTRIAL MINERALS SECTOR

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1. INTRODUCTION

The draft development documents comprising the draft Effluent Monitoring Regulations for the Industrial Minerals Sector were provided by the Minister of the Environment to the MISA Advisory Committee in mid-June, 1989 in advance of Committee Meeting 49 held on June 23rd. At that meeting, the Committee received input from Ministry staff and representatives of the industrial sector.

The Committee member and representative for the Industrial Minerals Sector was Ms. Elizabeth Gardiner of the Ontario Mining Assocation. Harvey Clare was the MISA Advisory Committee's observer to the Joint Technical Committee.

2. ADVICE TO THE MINISTER

The MISA Advisory Committee has reviewed the draft regulation package, and generally supports the regulation, **recommending that the regulation package be released for public scrutiny.**

3. REGULATION-SPECIFIC RECOMMENDATIONS

3.1 **The MISA Advisory Committee accepts the proposal, on scientific as well as practical grounds, that for small producers within the quarries sub-sector, 20 of 110 sites be selected on a representative basis for intensive monitoring within the regulation. The Committee believes all producers should be listed within the regulation and that some form of reduced monitoring occur at the exempted sites.**

MISA Advisory Committee Report regarding the Draft Monitoring Regulations for the Ontario Mineral Industry: Group "B", Industrial Minerals Sector;

Submitted, August 2, 1989

MISA ADVISORY COMMITTEE

Jim MacLaren
Jim MacLaren, Chairman

Isobel Heathcote
Isobel Heathcote, Vice-Chairman

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Kai Millyard, Vice-Chairman

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Joanna Kidd, Member

DMackay
Don Mackay, Member

Paul Muld
Paul Muldoon, Member

Elizabeth Gardiner
Elizabeth Gardiner, Member, representing the Industrial Minerals Sector

PART F

THE MINISTRY'S RESPONSE TO THE
MISA ADVISORY COMMITTEE RECOMMENDATION
ON THE
INDUSTRIAL MINERALS SECTOR
DRAFT EFFLUENT MONITORING REGULATION

Ontario

Office of the
Minister

Ministry
of the
Environment

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08M1101

August 31, 1989

Mr. J. MacLaren
Chairman
MISA Advisory Committee
Suite 502
112 St. Clair Avenue West
Toronto, Ontario
M4V 1N3

Dear Mr. MacLaren:

I would like to thank you and the members of the MISA Advisory Committee (MAC) for your review of the Draft Effluent Monitoring Regulation for the Industrial Minerals Sector.

I am attaching the Ministry's response to specific recommendations made by MAC on the Industrial Minerals Sector Monitoring Regulation.

I hope that these comments will assist members of the public in reviewing the regulation and providing comments.

Yours sincerely,

Jim Bradley

Jim Bradley
Minister

Enclosure

RESPONSE TO THE MISA ADVISORY COMMITTEE RECOMMENDATION ON THE INDUSTRIAL MINERALS SECTOR DRAFT EFFLUENT MONITORING REGULATION

Throughout the regulation development process, the MISA Advisory Committee (MAC) has reviewed selected drafts of the regulation and provided comments to the Joint Industry/Government Technical Committee (JTC) for the Industrial Minerals Sector.

Many of these comments have been accepted and incorporated into successive versions of the Draft Regulation package. The MAC, after reviewing the penultimate draft, has submitted its final report (Part E).

The major recommendation from MAC and the corresponding MOE response is provided as follows:

MAC Recommendation

The MISA Advisory Committee accepts the proposal, on scientific as well as practical grounds, that for small producers within the quarries sub-sector, 20 of 110 sites be selected on a representative basis for intensive monitoring within the regulation. The Committee believes all producers should be listed within the regulation and that some form of reduced monitoring occur at the exempted sites.

MOE Response

Twenty sites have been selected to represent the quarries sub-sector. The Ministry believes that this number of sites is adequate to provide a comprehensive database on the discharges of conventional and toxic pollutants from the quarries sub-sector. As a result of similarities between plants, the data collected will be representative and can be shared among all sub-sector plants. Monitoring results will be reviewed as received. If anomalies are identified that warrant intensive monitoring of the remaining quarry sites, we will do so.

All quarry sites will be listed within the regulation.

Since a comprehensive database will be obtained from the representative sites, it is not necessary to do some form of reduced monitoring under this regulation at the exempted sites. However, the exempted sites shall continue to report to the Ministry the results of all chemical analyses and flow measurements required to be done by a permit to take water given under section 20 of the Ontario Water Resources Act or by Certificate of Approval under section 24 of the Ontario Water Resources Act. They will also be required to submit an abbreviated Initial Report which includes plot plans, process block diagrams, chemicals used or stored on site and legal ownership.